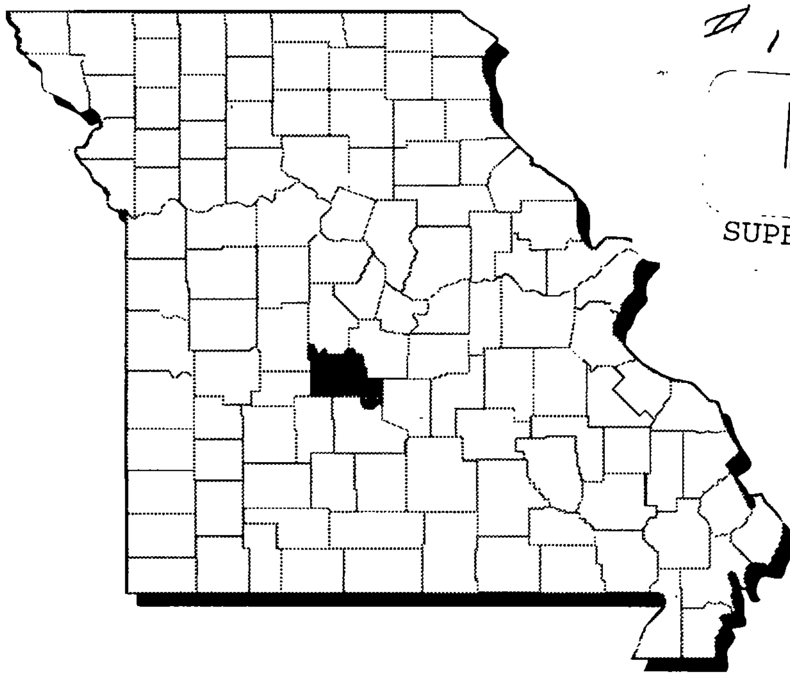
# COMBINED PRELIMINARY ASSESSMENT/SITE INSPECTION REPORT

## Former Hulett Lagoon Site
## Camdenton, Missouri

March 30, 1999





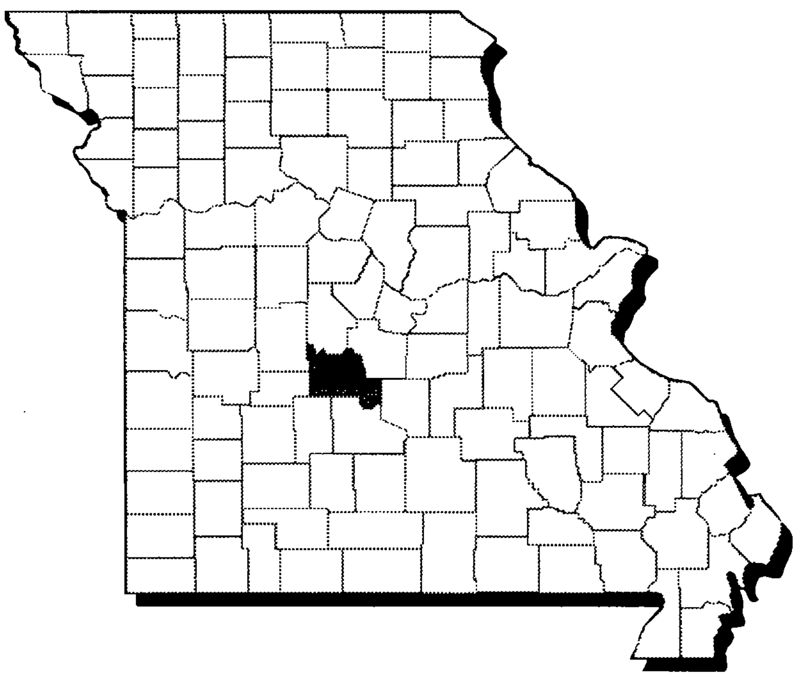

Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

# NARRATIVE

# COMBINED PRELIMINARY ASSESSMENT/SITE INSPECTION REPORT

## Former Hulett Lagoon Site
## Camdenton, Missouri

March 30, 1999



Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

## TABLE OF CONTENTS

## TABLE OF CONTENTS, Cont'd.

## TABLE OF CONTENTS, Cont'd.

**DATE:** March 30, 1999

**PREPARED BY:** Valerie H. Wilder
Missouri Department of Natural Resources

**SITE:** Former Hulett Lagoon
Camden County

**C.A. NUMBER:** V997381-98-0

**EPA ID. NUMBER:** N/A

## 1.0 INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Missouri Department of Natural Resources (DNR), through a cooperative agreement with the U.S. Environmental Protection Agency (EPA), conducted a combined Preliminary Assessment/Site Inspection (PA/SI) at the Former Hulett Lagoon site in Camden County, Missouri. The purpose of this investigation was to collect sufficient information concerning conditions at the site to assess the threat posed to human health and the environment, to determine the need for additional investigation under CERCLA/SARA or other authority, and if appropriate, support ranking the site using the Hazard Ranking System (HRS) for proposal to the National Priorities List (NPL). The scope of the investigation included review of previous file information, sampling of waste and environmental media to evaluate and document HRS factors, and collecting additional non-sampling information. Investigations included site visits on December 1, 16, 1998 and site sampling on January 6-7, 21,1999. The PA/SI was initiated on October 27, 1998.

## 2.0 SITE DESCRIPTION

### 2.1 Location

The Former Hulett Lagoon site is the location of a closed wastewater lagoon. The lagoon is located in the City of Camdenton, 500 feet northeast of the intersection of Dawson Road and Sunset Drive (Reference 3). Geographic coordinates for the site are 38°00'41.1" north latitude and 92°45'17.0" west longitude, as measured using the Garmin 12LX Global Positioning System (Reference 4). The lagoon is in the Southwest Quarter (SW 1/4) of the Southwest Quarter (SW 1/4) of the Southwest Quarter (SW 1/4) of Section 24, Township 38 North, Range 17 West in Camden County. Figure 1 is a site location map (Reference (Reference 3).

The site can be accessed from the intersection of U.S. Highway 54 and State Route 5 in Camdenton by taking State Route 5 northwest for 0.3 of a mile to East Mulberry; take a left onto East Mulberry and the first right onto West Mulberry. When the paved portion of West Mulberry curves to the left, continue straight onto a gravel driveway that leads behind the Ron Hulett Chev-Olds-Buick Jeep/Eagle Automobile Dealership. Stay to the left on a gravel road that leads down to the lagoon. This road is not regularly maintained; there are several severe ruts caused from washouts (Reference 5).

The Camdenton area receives an average of 42.32 inches of precipitation annually, and an average of 19 inches of snowfall annually (Reference 6, p. 2). The 2-year 24-hour rainfall estimated at 3.5 inches (Reference 7). The average daily temperature during the summer months is 77° F, and the average winter temperature is 35° F (Reference 6, p. 2). The average wind speed and direction is approximately 10 miles per hour from the south (Reference 8, p. 74).

## 2.2 Site Description

The former Hulett lagoon is a closed wastewater sewage lagoon operated by the City of Camdenton from 1961 to 1988. The lagoon was approximately one acre in size (Reference 9, p. 12). Photos 1 and 2 were taken in October 1974 when the lagoon was operating. Photo 1 shows the north side of the lagoon where an influent pipe from a city sewer line entered the lagoon. Photo 2 shows the south side of the lagoon where an influent pipe from an industrial facility entered the lagoon. The wooden catwalk, also shown in photo 2, extended into the lagoon and supported the outlet pipe, which ran under the catwalk, and could be raised and lowered with a crank handle (the red apparatus on the end of the catwalk railing). More detailed operating conditions are discussed in the next section. A dirt road ran along the berm and surrounded the lagoon, as shown in photos 1 and 2.

In 1989, the lagoon was closed; the water was drained and the sludge was removed (Reference 9, p. 12). Photo 3 was taken during the dewatering process. The site is currently an open field area with grassy vegetation (Photos 4, 6-8). Remnants of the former berm and the road that surrounded the lagoon are still visible. The lagoon area is generally flat with surface runoff flowing to the northwest and entering an intermittent drainage that travels to the west. There is a monitoring well (MW), installed in July 1998, located just outside what would have been the southwest edge of the berm of the lagoon. This is known as MW-5 (Reference 5).

The lagoon is located in a mixed residential/commercial area of Camdenton. It is bordered on the north by an apartment complex (Photo 8); on the west by a strip of woods about 500 feet wide with Dawson Road on the other side; on the east by woods (Photo 7); and on the south by a strip of woods (Photo 6) and then residents. Access to the lagoon area is not restricted. There is no fencing or gates. The Ron Hulett car dealership personnel have

reported unauthorized dumping in the wooded area behind their facility that borders the road leading down to the lagoon (Reference 5).

## 2.3 Operational History

General Overview of Hulett Lagoon

The City of Camdenton, Missouri has owned the former Hulett lagoon property since at least 1961 and retains ownership today. The lagoon was constructed in 1961 under the State of Missouri Grants Program. The lagoon was constructed of clay, and its berms were approximately 25 feet wide and 15 feet high (Reference 9, p. 12). The lagoon was named and most commonly referred to as the Hulett Lagoon due to its proximity to the Ron Hulett automobile dealership that is located at 249 N. Highway 5 (Reference 5). The lagoon was also referred to as the Factory Lagoon and Camdenton Lagoon #3 (Reference 10).

The Hulett lagoon was in operation from 1961 until its closure in late 1989. It was one of five municipal lagoons that serviced the City of Camdenton, however, it was the only lagoon that received industrial effluent in addition to domestic sewage. From 1967 through 1986 a nearby manufacturing facility released untreated wastewater and storm water into the lagoon through a series of "mudpits", or sumps, via a storm sewer. In 1986, the facility installed a pretreatment wastewater system that replaced the mudpits and lagoon system (References 9, p. 12; 11, p. 1).

The facility is located approximately 1,000 feet southeast of the lagoon at 179 Sunset Drive. Heat transfer components for commercial and automotive industries are manufactured at the facility. The untreated wastewater was known to have contained several hazardous waste streams including corrosive waste, wastewater treatment sludges from electroplating operations, and waste oil. In addition, residual contaminants associated with degreasing operations, including TCE, was discharged into the mud pits and ultimately into the Hulett lagoon (References 9, p. 12; 11, p. 1; 16, p. 8).

Ownership History of Facility at 179 Sunset Drive

The 179 Sunset Drive property was originally held by Dawson Metal Products, Inc., a Kansas Corporation ("Dawson-Kansas"), pursuant to a lease dated November 28, 1966 between Dawson-Kansas and the Camdenton Industrial Development Corporation. The lease had a term of ten years, which is believed to have commenced July 1, 1967, with an option for Dawson-Kansas to purchase (Reference 12, p. 3).

On June 12, 1972, Dawson Metal Products, Inc. was issued a Certificate of Incorporation in the State of Delaware (Reference 13). In 1972 Sundstrand Corporation incorporated Dawson Metal Products, Inc., a Delaware Corporation ("Dawson-Delaware"), as a wholly owned subsidiary of Sundstrand Corporation. On June 29, 1972, Dawson-Delaware acquired the business and assets of Dawson-Kansas. In connection with the acquisition Dawson-Delaware, by way of assignment, acquired a leasehold interest in the 179 Sunset Drive property (Reference 12, p. 3). On September 25, 1972, Dawson Metal Products, Inc.

(the Delaware Corporation) was authorized as a Foreign Corporation in the State of Missouri to carry on the business of sale and distribution of air conditioning equipment and related parts (Reference 14).

On May 25, 1977 Dawson Metal Products, Inc. (the Delaware Corporation) changed its corporate name in the State of Missouri to Sundstrand Tubular Products, Inc. (Reference 15).

On August 24, 1990, Sundstrand agreed to sell the business and assets of Sundstrand Tubular Products, Inc. to Modine Heat Transfer, Inc., a wholly owned subsidiary of Modine Manufacturing Company, a Wisconsin based corporation that operates and conducts business in the state of Missouri. This transaction was closed on October 18, 1990 (References 16, pp. 3, 4; 12, p. 3).

On November 27, 1990, Sundstrand Tubular Products, Inc. changed its name to Sundstrand Camdenton, Inc (Reference 12, p. 3). On April 18, 1991, Sundstrand Tubular Products, Inc., a Foreign Corporation, was formally withdrawn from the State of Missouri (Reference 17). On March 15, 1994 Sundstrand Camdenton, Inc. was liquidated (Reference 12, p. 3).

On April 1, 1997, Modine Heat Transfer, Inc. merged with Modine Manufacturing Company; thus, changing its name to Modine Manufacturing Company. Modine is the current owner/operator of the facility (Reference 16, pp. 3, 4).

<u>Operational History of 179 Sunset Drive Facility</u>

The facility at 179 Sunset Drive has always been used to manufacture air-conditioning coils and feeder parts from aluminum and copper tubing. According to Sundstrand personnel, the manufacturing process flowed as follows:

- copper and aluminum tubing were fed from rolls to benders to form U shapes and then cut off;
- parts were then immersed in alkaline cleaning lines to remove oil and chips;
- parts were degreased to remove any remaining oil;
- clean parts were assembled and small U shaped copper tubing and aluminum tubing ends were brazed to assembled cores using manual and automatic brazing systems;
- the assembled heat transfer components were degreased and/or alkaline cleaned and then tightness tested using refrigerant; and
- finally, the components were then painted if required by the customer and packaged for shipment (Reference 12, p. 4)

The manufacturing process consisted of aluminum etching, and a small amount of chromium electroplating (Reference 11, p. 2). According to an Environmental Site

Assessment conducted in November 1991 for Modine Manufacturing Company, the facility generated TCE waste during degreasing operations from the early 1970's to December 1990. In December 1990, they began using 1,1,1-trichloroethane (TCA) for degreasing operations (Reference 18, p. 1).

Four mudpits (sumps) were utilized by the facility from 1967 to 1986. The mudpits were connected by a six-inch steel line that delivered storm water (from 1979 to 1983, eliminated in 1983), boiler water and cleaning line waste to the Hulett lagoon. The mudpits were located adjacent to the manufacturing building on the west side. Each mudpit consisted of a 4' x 4' x 4' cement sump. Each sump received the previous sumps' wastes until discharged into the sewer. The southern most mudpit, #4, was an open pit that collected boiler water and storm water. Mudpit #3 collected aluminum cleaning line waste and storm water from mudpit #4. Mudpit #1 collected copper cleaning line waste in addition to aluminum cleaning line waste and storm water from the first two mudpits. Hulett lagoon potentially received hazardous waste from the facility's four mudpits and associated piping, identified by the following hazardous waste codes: F006 (wastewater treatment sludges from electroplating), D002 (corrosive waste) and D098 (waste oil). In addition, residual contaminants associated with degreasing operations, including TCE, did go through collection lines into the mud pits and ultimately into the Hulett lagoon (References 9, p. 13; 16, p. 8).

## Operational History/Regulatory Compliance of Hulett Lagoon

The Hulett Lagoon operated with a National Pollutant Discharge Elimination System (NPDES) Permit (MO-0048577) issued under the Clean Water Act by the DNR's Water Pollution Control Program (WPCP) (Reference 10). The WPCP database shows the permit issued July 1985, although it is likely the permit was actually issued earlier. The permit was terminated February 29, 1988.

### DNR Inspection - September 7, 1978

In September 1978, DNR personnel conducted an inspection of the operation and condition of the wastewater treatment facilities serving the City of Camdenton. The inspector noted that the Hulett Lagoon had a large problem with its industrial influent. The sewage from Sundstrand was entering the lagoon at the south end, which was the same end that the lagoon's discharge pipe was located. The retention time for the industrial waste was far too short a period to treat the waste. To correct the problem, it was recommended that the location of the influent pipe from Sundstrand be moved to the north end of the lagoon, or the sewage line be tied in to the other influent line already at the north end. The inspector also noted that the strength of the Sundstrand industrial sewage entering the Hulett Lagoon was apparently too great for the facility to handle. It was recommended to the city that they enforce their sewer use ordinance to prevent misuse of the sewers and sewage treatment facilities (Reference 19).

DNR Geologic Investigation - September 12, 1978

On September 12, 1978 DNR personnel from the Division of Geology and Land Survey (DGLS) conducted an investigation for an Engineering Geologic Report on the Collapse Potential of Camdenton Lagoons. The inspector noted that the problems at the Hulett lagoon appeared to be design related and not geologic. Like the previous inspectors, DGLS personnel noted the short circuiting problem. They observed effluent from the metal fabricating plant bubbling up approximately 40 feet from the discharge pipe. There was an area of thick floating effluent. An open channel existed directly from the inlet pipe to the discharge pipe. Discharge from the lagoon was dark green in color with thick white foam floating on the surface (similar to that in Photo 2) (Reference 20).

Lagoon Sampling in 1984

On May 22, 1984 the City of Camdenton collected samples of the Hulett lagoon water, Sundstrand's influent to the lagoon, housing influent to the lagoon, effluent from the lagoon, and water near Lake of the Ozarks. Results showed 41 parts per billion (ppb) TCE in the Sundstrand influent and 28 ppb TCE in the effluent from the lagoon (Reference 21).

On July 19, 1984 additional samples of Sundstrand's effluent and lagoon water were collected. This Sundstrand effluent sample showed 4,900 ppb TCE in addition to 7,600 ppb, total chromium, 29,000 ppb total copper, and 1,400 ppb total zinc. The sample from the lagoon showed 500 ppb TCE, 500 pbb total chromium, 200 ppb hexavalent chromium, 4100 ppb total copper and 230 ppb total zinc (Reference 22).

Construction of Sundstrand's Pretreament Plant in 1986

Sundstrand and the City of Camdenton joined efforts in 1986 to obtain a Community Development Betterment Grant (CDBG) from the state to construct a pretreatment plant at the Sundstrand facility. The plant was completed and on line as of April 14, 1986. The plant still operates today (Reference 23).

Construction Permit for Lagoon to Replace Hulett Lagoon

On September 23, 1986, DNR issued the City of Camdenton a Construction Permit for sewers, force mains and lift stations for transport of waste to the C.P. White Lagoon. The construction permit stated that these facilities were designed to allow for elimination of the existing factory lagoon (Hulett Lagoon) (Reference 24).

Pretreatment Monitoring Report - April 30, 1987

At the request of DNR's WPCP, a pretreatment monitoring survey was conducted of the industrial wastewater discharge of the Sundstrand Tubular Products factory. On April 30, 1987, DNR's Environmental Services Program (ESP) collected a grab sample of the effluent from the treatment system discharge weir. The sample was analyzed for cyanide, total metals (silver, cadmium, chromium, copper, hexavalent chromium, nickel, lead, zinc). The sample was also supposed to be analyzed for volatile organic compounds (VOCs), however, there were no results for VOCs due to analytical error. Results showed

chromium at 2,700 ppb, copper at 890 ppb, hexavalent chromium at 180 ppb, nickel at 50 ppb, and zinc at 110 ppb (Reference 25).

<u>Hulett Lagoon Closure</u>

In 1988, the City of Camdenton began closure of the Hulett Lagoon pursuant to an Industrial Development Grant overseen by DNR's WPCP. As per DNR guidelines for closing out municipal lagoons, sampling and analysis of the sludge in the lagoon was limited to metals and other parameters such as total solids. High levels of chromium, lead, and nickel were detected (Reference 26). DNR offered the City officials several options to consider in completing the closure of the lagoon (Reference 27). The option chosen and implemented by the city was subsurface application of the sludge from the lagoon to a sludge disposal site owned by the city. DNR approved the sludge disposal plan on February 22, 1989 (Reference 28).

The city's engineering consultant, Missouri Engineering Corporation, supervised the lagoon closure project. In June 1989, McCormick Gravel & Excavating of Versailles, Missouri was awarded the contract for the removal, stockpiling and disposal of sludge from the lagoon. The contract included lagoon dewatering, preparation, transportation, and stockpiling of the sludge, as well as disposal by land application at chosen site at the Camdenton Memorial Airport (CMA), four miles southeast of Camdenton (References 29; 30).

The specifications called for the contractor to pump the water from the lagoon and discharge it into the existing sewer manhole approximately 100 feet away (Reference 29). The process of removing the sludge at the lagoon began on July 11, 1989 and was completed sometime in late September 1989. Lime was added to the sludge at the lagoon to raise the pH and immobilize the metals. The project contract was originally written with an estimate of 1,500 cubic yards of sludge to be removed. However, due in part to an unusually high amount of rain during the removal process, the sludge did not dry out and shrink, as it should have. In addition, each time it would rain, the rain would cause the sludge to be spread across the lagoon contaminating more soil. The lagoon had to be pumped again and the sludge allowed to dry. A small amount of soil then had to be removed along with the sludge. When that portion of the project was completed, an estimated 2,395 cubic yards of sludge had been removed (References 31; 32; 33). The berms of the lagoon were turned in and mixed with a 1 to 1 ratio (Reference 34). No soil was brought in for the mixing. Some soil from the hillside southeast of the lagoon was scraped in to fill the void (Reference 5).

The sludge was deposited at the CMA from July through December 1989. The area at the CMA where the sludge was disposed of is being investigated as a separate site - the Camdenton Sludge Disposal Area. A Combined Preliminary Assessment/Site Inspection is being conducted at the site, and will be completed by April 1999.

## 2.4 Site History and Previous Investigations

Preliminary Assessment/Site Inspection at 179 Sunset Drive Facility
In 1992, DNR conducted a PA and an SI of the facility at 179 Sunset Drive under the name Sundstrand site (MOD062439351). The investigations were initiated due to a complaint filed with DNR alleging that 4,500 gallons of TCE had been spilled at the facility. Neither the PA nor the SI included any off-site investigations of the former lagoon or sludge disposal area (References 35; 36).

In addition to the PA and SI conducted by DNR, there were several other investigations conducted at the Modine facility during that time period by EPA contractors and Modine consultants. In general, all of the investigations documented and/or confirmed the presence of chlorinated solvents, including TCE, in the soils and groundwater at the facility. At that time, the DNR determined that oversight authority of the facility was most appropriate under the Resource Conservation and Recovery Act (RCRA).

RCRA Corrective Action at 179 Sunset Drive Facility
Modine Manufacturing Company is currently negotiating a Corrective Action Abatement Order on Consent (AOC) through the Permits Section of DNR's Hazardous Waste Program (HWP). The objectives of the AOC include investigation to determine the nature and extent of any release of hazardous waste at the facility and to remediate any releases in order to protect human health and the environment (Reference 16). There have already been several investigations and a certain amount of remedial activities conducted by Modine at the facility and in the surrounding area. Detailed information regarding a subsurface investigation conducted at the Hulett lagoon in 1996 is included in Section 3.1 Previous Waste/Source Sampling. More information regarding groundwater sampling conducted in the area is included in Section 4.2 Previous Groundwater Sampling.

Referral of Former Hulett Lagoon to Superfund Section
On September 8, 1998 the Permits Section of the HWP formally referred investigation of the former Hulett Lagoon to the Superfund Section of the HWP. Investigation of the Hulett Lagoon is not included in the AOC with Modine due to the fact that, in addition to receiving wastewater from the facility at 179 Sunset Drive, the lagoon also received domestic sewage from the surrounding residences. A dye trace study of the City of Camdenton's sewer system performed by DNR's DGLS on August 5, 1998, verified that facility wastewater mixes with domestic sewage prior to entering city property (Reference 37).

According to 40 CFR 261.4(a)(1), domestic sewage and any mixture of domestic sewage and other wastes that pass through a sewer system to a publicly owned treatment works (POTW) are not considered solid wastes, and thus would not be considered hazardous wastes. The facility that disposes of such wastes is excluded from RCRA permitting requirements, which is why the Hulett Lagoon site was referred to Superfund to be addressed under CERCLA. CERCLA has no such exemption.

## 2.5 Waste Characteristics

The primary contaminant of concern at the Former Hulett Lagoon site is the volatile organic compound (VOC) trichloroethene (TCE). Analytical results from soil and groundwater sampling show TCE at concentrations above Superfund Chemical Data Matrix (SCDM) health-based benchmarks as well as the Maximum Contaminant Level (MCL) for drinking water (Reference 38).

### Trichloroethene

TCE is a nonflammable, colorless liquid at room temperature with a somewhat sweet odor and sweet, burning taste. The manmade chemical does not occur naturally in the environment. TCE is now mainly used as a solvent to remove grease from metal parts. It is also used as a solvent in other ways and is used to make other chemicals. TCE evaporates easily into the air but can persist in the soil and groundwater. Once TCE is in surface water, much of it will evaporate into the air. It will take days to weeks to break down in surface water; in groundwater, the breakdown is much slower because of the slower evaporation rate. Very little TCE breaks down in the soil, and it can pass through the soil into underground water (Reference 39, pp. 1, 2).

TCE can enter the body from breathing air or drinking water containing TCE. It can also enter through the skin, but not as easily as by breathing or drinking. If the chemical is inhaled, about half will enter the bloodstream and organs; the remaining is exhaled. If TCE is swallowed, most will be absorbed into the blood. The liver changes most of the TCE to other chemicals and the majority of these breakdown products leave the body in the urine within a day. Some of the common symptoms to TCE exposure (usually at high levels) are headaches, dizziness, and rashes. Laboratory animals that were exposed to moderate levels of TCE had enlarged livers, and high-level exposure caused liver and kidney damage. However, it is not known if these changes would occur in humans. TCE is considered an animal carcinogen (Reference 39, pp. 1-4).

TCE is known as a Dense Nonaqueous Phase Liquid (DNAPL). DNAPLs are separate-phase hydrocarbon liquids that are denser than water. DNAPLs can exist in the soil/aquifer matrix in free-phase form or in residual form. When released on the ground's surface, free-phase DNAPLs move downward through the soil matrix under the force of gravity or laterally along the surface of sloping fine-grained stratigraphic units. As free-phase DNAPLs move, residual amounts are trapped in pores and/or fractures by capillary forces. Trapped DNAPLs are known as residual saturation. This residual saturation is a function of the physical property of the DNAPL and the hydrogeologic characteristics of the soil/aquifer medium, which typically ranges from 5-50% of total pore volume (Reference 40).

Most DNAPLs undergo only limited degradation in the subsurface and persist for long periods of time, while slowly releasing soluble organic constituents to groundwater through

dissolution. Dissolution may continue for hundreds of years under natural conditions before the DNAPL is dissipated (Reference 40).

## 3.0 WASTE/SOURCE SAMPLING

### 3.1 Previous Sampling (Reference 41)

On October 11, 1996, on behalf of Modine Manufacturing Company, Dames & Moore conducted a subsurface investigation at the former Hulett lagoon. The purpose of the investigation was to determine the presence or absence of VOCs, in particular TCE, in soil at the former Hulett lagoon.

Four hydraulically driven probes were advanced in the area of the lagoon where the inlet pipe from the former Sundstrand facility and the outlet or discharge pipe from the lagoon were previously located. The soil within the probe cores was continuously sampled and field screened using a photoionization detector (PID). The soil sample exhibiting the highest indication of VOC content from each probe core was submitted for analysis. The samples were analyzed for VOCs only. The following table presents results for those samples.

**TABLE 1: SELECTED ANALYTICAL RESULTS FROM SOIL SAMPLES COLLECTED BY DAMES & MOORE IN HULETT LAGOON ON OCTOBER 11, 1996**

| Sample ID | Depth | Analyte Detected | Concentration (in ppm) |
|---|---|---|---|
| GP-1 | 4' - 6' | chloroform | 0.20 |
| | | TCE | 9.17 |
| GP-2 | 4' - 5.5' | TCE | 1.94 |
| GP-3 | 4' - 5' | chloroform | 0.0094 |
| | | cis-1,2-dichloroethene | 0.0914 |
| | | TCE | not detected |
| GP-4 | 4' - 6' | TCE | not detected |

Although the majority of sludge from the lagoon was supposedly removed during closure, these sampling results indicated that TCE contamination was still present in the lagoon area. Dames & Moore and Modine have concluded that the TCE concentrations encountered in the soil at the lagoon supports their previous position that the former lagoon is the off-site source of the observed TCE impact to groundwater at the Modine facility. DNR RCRA Permits personnel hold the position that the nature, extent and source of the TCE groundwater contamination in the area has not been fully determined yet. That is one of the objectives of the AOC currently being negotiated. At least four waste management units on the 179 Sunset Drive property have been identified as potential contributors to TCE soil and groundwater contamination (Reference 16).

### 3.2 PA/SI Sampling (Reference 38)

PA/SI soil sampling in the lagoon area was conducted on January 21, 1999. Figure 2 is a site map that shows collection location of all soil samples in the lagoon area. A membrane interface probe (MIP), equipped with a PID and a flame ionization detector (FID), was employed to generate soil gas data of the subsurface within and surrounding the boundaries of the former lagoon area.

Ten soil borings (Hulett-01 through Hulett-10) were drilled utilizing a track-mounted hydraulic soil probe. Eight soil grab samples were collected from the lagoon area and one background sample was collected from outside the lagoon. Based upon this sampling, the lagoon is estimated to have been approximately six feet deep. Previous sampling documented refusal, meaning bedrock was encountered, in drilling from a range of five to six feet below ground surface, depending on the boring location. The PA/SI background boring was drilled approximately 25 feet south of the lagoon's edge. The background sample was collected from a 10.5' to 11' depth, which was a similar depth zone as the majority of the source samples from the lagoon, correcting for the rise in elevation at the background sampling point.

### 3.3 PA/SI Analytical Results (Reference 38)

Reference 38, Appendix B contains the MIP data logs generated for each boring. The logs indicate detections noted on the MIP's PID (identified as "Detector 1") and the FID ("Detector 2"). There were not any significant detections with the MIP for any of the borings.

Table 2, on page 13, presents the analytical results for all soil samples collected by DNR as part of the PA/SI. All soil samples were analyzed for total metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, and silver) and VOCs. If any sample's total analyte levels exceeded 80% of 20 times the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit for a particular analyte, TCLP analysis was performed on that sample.

The last column in Table 2 lists the Missouri Cleanup Action Level (CALM) $C_{LEACH}$ level for each chemical. These values were listed for additional comparison. The Superfund Chemical Data Matrix (SCDM) benchmarks and MO Any-Use Soil Levels (ASLs) for chemicals only take into account human health effects related to exposure to the chemicals in the soil. They do not take into account the effect the chemicals have when they leach into the groundwater. The $C_{LEACH}$ value was calculated to approximate the physical processes involved in a soil contaminant leaching to the groundwater. The $C_{LEACH}$ value may be interpreted as a soil contaminant concentration, which (within the limitations of the formulas and assumptions used for calculation) if allowed to remain, would leach to the saturated zone and result in a groundwater concentration at or below the MCLs.

Three soil samples contained TCE at a detectable level. TCE was not detected in the background soil sample. The concentrations of TCE detected in the three samples from the lagoon exceed the $C_{LEACH}$ value for TCE, which would indicate the potential exists for TCE to leach into the saturated zone and result in groundwater contamination above the MCL. This is, in fact, the situation at this site, as documented from groundwater samples collected from the monitoring well on-site (discussed in Section 4.5) (Reference 42).

The only sample that contained any metals significantly above background was 991471 from soil boring 4. Barium and cadmium were over three times the background levels, however neither metal was present above the SCDM benchmarks or MO ASLs.

## 3.4 Conclusions

Although over 2,000 cubic yards of sludge were removed from the lagoon during closure in 1989, PA/SI sampling, as well as previous sampling, document that TCE contaminated soil still remains in the lagoon area. Three samples, collected for the PA/SI near the previous location of the outfall pipe, contained TCE at 9.5 ppm, 0.24 ppm and 0.12 ppm. These TCE concentrations are below health-based benchmarks protective of human exposure to the soil. However, the concentrations exceed the Missouri CALM $C_{LEACH}$ value, which was calculated as a value at which TCE would leach to the saturated zone and result in a groundwater concentration at or below the MCLs. The $C_{LEACH}$ value for TCE was calculated using specific formulas and assumptions that may not necessarily model site conditions at the Hulett lagoon.

One way of testing whether the TCE present in the soil at the lagoon has the potential to leach into groundwater at a level above the MCL would be to perform the Synthetic Precipitation Leaching Procedure on the soil samples. This may be necessary in future investigations.

**TABLE 2: ANALYTICAL RESULTS FROM SOIL SAMPLES COLLECTED IN/NEAR THE HULETT LAGOON**

All results in parts per million (ppm) * soil saturation level substituted for ASL NA - not analyzed NL - not listed
Underlined results are those that are three times above background or above the detection limit if the background concentration is below the detection limit

| | Hulett-01 4.5' - 5' | Hulett-02 6.5' - 7' | Hulett-03 3' - 4' | Hulett-03 4.5' - 5.5' | Hulett-04 7.5' - 8' | Hulett-07 5.5' - 6' | Hulett-09 6' - 7' | Hulett-09 6' - 7' | Hulett-10 10.5' - 11' | SCDM Bnchmrk | MO ASL | MO CALM $C_{LEACH}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 991469 | 991470 | 991467 | 991468 | 991471 | 991472 | 991473 | 991474 (replicate) | 991475 (backgrnd) | | | |
| METALS | | | | | | | | | | | | |
| Arsenic, total | 16.1 | 3.58 | 13.6 | 12.5 | 19.7 | 17.2 | 9.68 | 4.6 | 10.7 | 0.0043 | 11 | NL |
| Barium, total | 150 | 62.4 | 244 | 519 | 750 | 257 | 103 | 132 | 203 | 5500 | 3900 | 1650 |
| Barium, TCLP | NA | NA | NA | 0.442 | 0.628 | NA | NA | NA | NA | | | |
| Cadmium, total | 0.453 | 0.254 | 0.304 | 0.386 | 4.52 | 0.304 | <0.2 | 0.204 | 0.651 | 39 | 28 | 11 |
| Chromium, total | 74.9 | 31.9 | 55.5 | 61.3 | 68.9 | 73.3 | 58.2 | 39.8 | 62.7 | 390 | 5600 | 38 |
| Copper, total | 39.9 | 15.7 | 33.6 | 37.5 | 64.3 | 38.8 | 6.47 | 8.56 | 36.8 | NL | NL | NL |
| Lead, total | 116 | 38.1 | 118 | 951 | 325 | 80.1 | 39.1 | 61.8 | 94.2 | NL | 240 | NL |
| Lead, TCLP | <0.025 | NA | 0.0772 | 0.143 | <0.025 | <0.025 | NA | NA | <0.025 | | | NL |
| Mercury, total | 0.102 | <0.04 | 0.107 | 0.139 | 0.195 | 0.141 | <0.04 | <0.04 | 0.0947 | 23 | 17 | 3.23 |
| Nickel, total | 43.3 | 12.5 | 49.4 | 69.6 | 90.1 | 36.2 | 9.76 | 12.4 | 32.5 | 1600 | 1100 | 170 |
| Selenium, total | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 390 | 280 | 4.37 |
| Silver, total | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 390 | 280 | 255 |
| VOCs | | | | | | | | | | | | |
| Cis-1,2-dichloroethene | 0.19 | 0.14 | <0.025 | <0.025 | <0.025 | 0.11 | <0.025 | <0.025 | <0.025 | 780 | 490* | 0.51 |
| Trichloroethene | 9.5 | 0.24 | <0.025 | <0.025 | <0.025 | 0.12 | <0.025 | <0.025 | <0.025 | 58 | 340 | 0.097 |

## 4.0 GROUNDWATER PATHWAY

### 4.1 Hydrogeologic Setting (Reference 43)

Stratigraphic Units
A stratigraphic column (Table 3 on page 18) has been tabulated based upon the stratigraphy of nearby wells. The youngest bedrock formations beneath the site are expected to be Ordovician-age sediments assigned to the Canadian Series. The Roubidoux Formation consists of dolomite, sandy dolomite, and sandstone. In the Camdenton area, soluble portions of the Roubidoux have generally been removed by dissolution. Nearby well logs indicate that the Roubidoux Formation may have been completely removed by erosion in the vicinity of the site.

Underlying the Roubidoux Formation, the Gasconade Dolomite consists of cherty dolomite and is estimated to be approximately 300 feet thick in the vicinity of the site. A basal unit of the Gasconade Dolomite, known as the Gunter Sandstone Member, commonly separates the Ordovician and Cambrian-age strata. The Gunter Sandstone is approximately 25 feet thick in the Camdenton area.

Cambrian rocks in the Camdenton area were deposited in a complex depositional environment. Camdenton is located near the western margin of a Cambrian-age intrashelf sedimentary basin known as the Central Missouri Basin. To the west lies the north-south trending Lebanon Arch, which consists of carbonate platform rocks, that in some areas, thin over Precambrian highlands. Dramatically different lithologies and abrupt facies changes are depicted in area well logs. In general, more shaly, basinal rocks to the east pinch-out against the Lebanon Arch.

Because of the tectonic setting, Cambrian beds in the Camdenton area are difficult to categorize, and "layer-cake" stratigraphy should not be assumed. The following descriptions are simplified. The upper-most Cambrian unit in the area is the Eminence Dolomite, which consists of approximately 300 – 635 feet of dolomite with minor amounts of chert. The Eminence Dolomite is underlain by about 25 - 230 feet of Potosi Dolomite, which consists of dolomite, chert, and drusy quartz. Beneath the Potosi Dolomite, in descending order, are the Derby-Doerun Dolomite, the shaly Davis Formation, the Bonneterre Formation, and the Lamotte Sandstone. The entire Cambrian section is estimated to be over 1,150 feet thick.

Aquifers
The Ozark Aquifer, which includes all bedrock units above the Cambrian-age Derby-Doerun Dolomite, is the shallowest aquifer beneath site. The Ozark Aquifer is considered exposed at the surface at the Former Hulett Lagoon site. The total thickness of the aquifer is approximately 950 feet. Each of the units which comprise the Ozark Aquifer have individual characteristics that control their water-bearing capabilities; however, in general, the Ozark Aquifer produces good-quality water, with production rates generally proportional

to well depth. Extensive pumping of groundwater in the Camdenton area has created a downward vertical gradient, and the site is located in a groundwater recharge zone.

Because detailed hydrogeologic studies have not been conducted at the site, groundwater flow directions within the bedrock can only be approximated. Prior to pumping of the aquifer, groundwater beneath the site probably flowed westward or northward to discharge areas in the Niangua River valley. Pumping rates at the Camdenton municipal wells are high enough to engulf the site within the cones of depression that surround the municipal wells. The radius of influence of nearby production wells should be determined.

Groundwater flow in the saturated zone is controlled by gradient. According to DGLS geologists, assertions made by Modine's consultants that preferential pathways in the Ozark Aquifer substantially influence flow direction in the saturated zone are incorrect. Water flows downhill; fractures or solution-enlarged channels cannot make water flow uphill. Monitoring well nests are needed to accurately determine the magnitude of the downward vertical gradient. The upper Gasconade Dolomite *may* inhibit the downward migration of contamination. However, fracturing and karst development may have resulted in a local increase in permeability within the otherwise relatively tight upper Gasconade Dolomite.

The Gunter Sandstone is generally highly porous and permeable and is an important source of domestic groundwater supplies in the area. Because the Gunter Sandstone generally yields adequate domestic water supplies, few private wells in the area penetrate the underlying Cambrian Formations. However, municipal wells in the Lake of the Ozarks area are generally cased through the Gunter Sandstone, in order to avoid possible bacterial contamination.

The Eminence and Potosi Dolomites are a major source of municipal drinking water throughout the Ozark area, including the City of Camdenton. The Eminence Dolomite is differentiated from the underlying Potosi Dolomite by the lack of druse. A druse is a rock cavity encrusted with finely crystalline quartz. The druse-rich Potosi Dolomite is the most permeable geologic unit within the Ozark Aquifer and generally has an extensive network of karstic channels.

The shallowest reliable aquitard beneath the site is the St. Francois Confining Unit, approximately 1,200 feet below the surface. The St. Francois Confining Unit separates the Ozark Aquifer from the deeper St. Francois Aquifer. The St. Francois Aquifer includes the Cambrian-age Bonneterre Formation and Lamotte Sandstone. The St. Francois Aquifer is not used as a water source in Camden County. Water losses in the Lamotte Sandstone are common in some parts of the Ozark Region, although the phenomenon is poorly understood. Outside the Cambrian outcrop area, few water wells penetrate the Lamotte Sandstone, since yields may actually be reduced. Groundwater flow directions in the deeper St. Francois Aquifer are generally unknown and may be complicated.

Baseline water-level and pumping rate data needs to be collected before informed decisions about groundwater movement in the Camdenton subsurface can be made. Static water levels should be measured at least monthly at any inactive wells. Detailed records of active wells should include volume of water pumped, length of pumping cycles, and drawdown measurements. The Mulberry City Well (which was shut down on January 26, 1999 because of TCE contamination) produced approximately three times the volume of the other two city wells, suggesting the aquifer is highly heterogeneous. The Mulberry Well probably intercepted more solution-enlarged cavities than the other city wells, although lithologic differences can also explain differences in well yield. Wide variations in aquifer parameters are common in carbonate areas.

The three Camdenton city wells produced a total of 232,458,000 gallons in 1997. An estimate of the cone of depression produced by this pumping can be made by comparing Camdenton to the city of Rolla, which is located in a similar ridge-top geologic setting approximately 50 miles east of Camdenton. In 1960, four Rolla city wells produced approximately 290,250,000 gallons of water from the Ozark Aquifer. The resulting cone of depression was over five miles wide. By 1960, pumping of the Ozark Aquifer in the Rolla area had dropped water levels up to 150 feet compared to the predevelopment potentiometric surface. The relatively deep depth to groundwater in the Camdenton area suggests a similar radius of effect can be expected. Any potential site-related contaminants reaching the water table are expected to move toward the nearest Camdenton City well. Until recently, hydraulic control beneath the Former Hulett Lagoon and Modine sites has been maintained by pumping at the Mulberry well. Now that the Mulberry well has been shut off, TCE contamination is expected to move toward another city well.

Monitoring wells at the Modine site are open to different depth intervals. Therefore, data from these wells cannot be used to create a potentiometric map. The fact that two of the four wells have gone dry in the past suggests that the vertical flow component is significant. Water levels in area wells tend to decrease with depth, supporting the statement that the vertical flow is downward. As previously mentioned, a downward gradient is to be expected in an active municipal well field, particularly if it is located on a ridge top. Static water levels measured during the construction of the newest Camdenton City well (Hickory Street or well # 7) also verify the downward gradient. The Hickory Street well is 1,100 feet deep with 462 feet of casing. The static water level before pressure-grout sealing of the well casing was 222 feet below ground surface. Static water level after sealing was 260 feet below ground surface, indicating a downward vertical gradient. A large upland area that might provide recharge to the Camdenton City wells does not exist. Groundwater monitored by the monitoring wells is essentially moving downward to recharge the pumping wells. Conclusions about lateral flow directions cannot be made based on water levels from the existing monitoring well network.

It has been suggested that contaminants reaching the saturated zone beneath Camdenton will follow "regional groundwater flow" and discharge at the Lake of the Ozarks. However,

groundwater withdrawals averaging over 500,000 gallons per day will create a large cone of depression and obliterate "regional groundwater flow" in any Ozark ridge top setting. A 2-hour pump test of the new Hickory St. well at 550 gallons per minute (gpm) caused a 176-foot drawdown in water level. There is no evidence to suggest that potential contaminants reaching the water table from either the Former Hulett Lagoon or the Modine site can somehow escape the Camdenton well field.

Aquifer Discontinuities
Minor folds and faults in the area cannot be considered aquifer discontinuities. However, it should be noted that the Cambrian-age formations that form the most productive portions of the Ozark Aquifer beneath the site are highly variable in lithology. The aquifer cannot be considered isotropic, nor does it possess radial symmetry. Aquifer parameters may be so variable as to render groundwater modeling useless.

Wellhead Protection Area
Camdenton is located in Area 1, as designated by the DGLS Wellhead Protection Section. Since September 1987, Area 1 bedrock wells have been required to have 80 feet of casing and penetrate at least 30 feet of bedrock. Wells within ¼ mile of the Lake of the Ozarks are located in Sensitive Area B and subject to additional requirements.

Karst Features
The Camdenton area is considered karst. Significant karst features are present within a four-mile radius of the site. When MW-5 was drilled at the site, numerous fractures and small voids were encountered. Over 5,000 gallons of water was lost during the drilling of the monitoring well.

## 4.2 Groundwater Targets

Groundwater use within four miles of the site is extensive. At least 3,420 people are served by public wells in the area and an estimated 409 people are served by private wells. A detailed description of the well use follows.

Public Drinking Water Wells
The City of Camdenton currently utilizes three wells to supply drinking water to city residents: the Rodeo Grounds well, the Blair Heights well, and the Hickory well. The city also has a fourth well, the Mulberry well, that was taken off line on February 2, 1999 due to TCE contamination. The Mulberry well is currently used only as a standby well when any of the other three wells are not operating. Since February 2, 1999, the Mulberry well has been on-line twice. Due to electrical problems at the Blair well, Mulberry well was pumped from February 2 to the 9th, for a total of about 400,000 gallons. Due to problems with the water controls, Mulberry well was pumped from February 12 - 16th, for a total of 1,314 gallons (References 44; 45).

**Table 3: Stratigraphic Column for Former Hulett Lagoon, Camden County (after Harvey et. al.,1983)**

| System | Aquifer Group | Approximate Site – Specific Thickness (ft) | Formation | Hydraulic Conductivity (cm/sec) | Regional Thickness (ft) | Dominant Lithology | Water-bearing Character |
|---|---|---|---|---|---|---|---|
| Quaternary | | 8 | Colluvium and residuum | | 0-90 | Regolith of residual clay, sand, chert pebbles and cobbles | May contain small amounts of perched water. |
| Ordovician | Ozark Aquifer | 0? | Roubidoux Formation | $10^{-3}$ | 0-90 | Clayey residuum, sandstone and sandy dolomite | Not present in sufficient thickness in the Camdenton area to produce usable quantities of water. |
| | | 300 | Gasconade Dolomite | $10^{-6}$ | 300-385 | Cherty dolomite, minor sandstone, and shale | Yields moderate to large quantities of water to wells. Yields range from 20 to 75 gpm. Less-permeable Upper Gasconade may act as a leaky confining unit. |
| | | 25 | Gunter Sandstone Member | $10^{-4}$ | 10-45 | Sandstone | Contributes moderate to large quantities of water. Most wells open to other formations. |
| Cambrian | | 500? | Eminence Dolomite | $10^{-5}$ | 240-600? | Cherty dolomite | Yields 6-100 gpm, the average being about 20 gpm |
| | | 150? | Potosi Dolomite | $10^{-4}$ | 30-330 | Dolomite; contains abundant quartz druse | Yields large quantities of water to wells. Yields range from 100 to 750 gpm. |
| | St. Francois Confining Unit | 180 | Derby-Doerun Dolomite | $10^{-7}$ | 80?-215 | Shaley dolomites and shale | Reliable aquitard. |
| | | 80 | Davis Formation | $10^{-7}$ | 50-380? | | |
| | St. Francois Aquifer | 160 | Bonneterre Formation | $10^{-5}$ | 85-200 | Dolomite and limestone | Generally used only in outcrop areas. May contribute additional 100-200 gpm to wells open to other formations. |
| | | 240 | Lamotte Sandstone | $10^{-5}$ | 140-300 | Sandstone and arkosic conglomerate | |
| Precambrian | Basement Confining Unit | | | | | Igneous and metamorphic rocks | Does not yield water to wells in this area |

The Rodeo well is located on Rodeo Road, just over one mile southeast of the site. The Rodeo well was drilled in 1961 to a total depth of 940 feet with 450 feet of eight-inch steel casing. The pump is set at 420 feet. The yielding strata is the Potosi Dolomite of the Ozark Aquifer. Records show the well yields 380 gpm (Reference 44).

The Blair Heights well is located on Lakeview Drive, 0.7 of a mile south-southwest of the site. The Blair well was drilled in 1974 to a total depth of 1060 feet with 400 feet of ten-inch diameter steel casing. The pump is set at 450 feet. The yielding strata is the Potosi Dolomite of the Ozark Aquifer. Records show the well yields 100 gpm (Reference 44).

The Hickory well is located at the southwest end of Hickory Street, 0.8 of a mile east of the site. The Hickory well was drilled in 1998 to replace the Mulberry well. The Hickory well was drilled to a total depth of 1100 feet with 450 feet of eight-inch diameter steel casing. The pump is set at 500 feet. The yielding strata is the Potosi Dolomite of the Ozark Aquifer (Reference 44).

The Mulberry well is located south of Mulberry Lane, 0.25 of a mile south of the site. The Mulberry well was drilled in 1986 to a total depth of 900 feet with 400 feet of twelve-inch diameter steel casing. The pump is set at 350 feet. The yielding strata is the Potosi Dolomite of the Ozark Aquifer. Records show the well yields 600 gpm (Reference 44).

When in use, the Mulberry well was blended with the other two wells, with the Mulberry well being the largest producer. The City of Camdenton's Public Works Director reported that the Mulberry well was the lead well until July 1998. Before July 1998 the controls on the wells were set such that Mulberry well was always the first to run; the Blair and Rodeo wells only ran when the Mulberry well was not able to handle the demand. During that time, the Mulberry well supplied about 70% of the water to the system. New controls were installed in July 1998, and the city was able to set the time the wells came on. In response to the TCE contamination showing up in the well, the Mulberry well was set as the third well to come on. With the new controls the Mulberry well was cut back to supply only about 40% of the water to the system (Reference 45). The City of Camdenton's water supplies a total of 3,010 people (Reference 46, p. 14).

The Windsor Estate Nursing Home well is located on Highway 5, approximately 1.4 miles northwest of the site. The well was drilled in 1969 to a total depth of 600 feet with 400 feet of six inch casing (Reference 61). This well serves 70 people (Reference 32, p. 131).

The Linn Creek well is located on Highway 5, approximately 2.9 miles northeast of the site. The well was drilled in 1984 to a total depth of 860 feet with 528 feet of six inch steel casing (Reference 62). This well serves 260 people (Reference 32, p. 33).

The Southway Terrace Mobile Home Park well is located on Highway 5, 2.3 miles northwest of the site. The well was drilled in 1970 to a total depth of 550 feet with 350 feet of six inch steel casing (Reference 63). This well serves 85 people (Reference 32, p. 120).

| **TABLE 4: PUBLIC WELLS WITHIN A 4-MILE RADIUS OF THE FORMER HULETT LAGOON SITE** | | |
|---|---|---|
| Distance from Site | Name of Well | No. of People Served* |
| 0 - 1/4 | City of Camdenton's Mulberry Well | 2,107† |
| 1/2 - 1 | City of Camdenton's Blair Well | 1,003‡ |
| | City of Camdenton's Hickory Well | 1,003‡ |
| 1-2 | City of Camdenton's Rodeo Well | 1,003‡ |
| | Windsor Estate Nursing Home | 70 |
| 2-3 | Linn Creek | 260 |
| | Southway Terrace MHP | 85 |
| TOTAL | | 3,425 |

* Reference 46, pp. 14, 33, 120, 131
† This represents the number of people apportioned to this well when it was in peak operation during the initial time period when TCE was detected in the well
‡ This represents the current situation in Camdenton without the Mulberry well operating

There are several drinking water wells within a four-mile radius of the site that are classified as transient, non-community water systems. They include mostly resorts and restaurants in the Lake of the Ozarks area. These wells, by definition, serve at least 25 different people at least 60 days out of the year (Reference 47). However, the number of people served by these wells will not be included in a count of potential targets due to the transient nature of the population.

<u>Private Drinking Water Wells</u>

Within four miles of the site, there are over 485 wells recorded in the DGLS databases. The LOGMAIN database contains information on older wells. The DGLS Well Wellhead Protection Section's Water Well Information System (W.I.M.S) database contains information on wells drilled since 1987. The vast majority of the wells on record are domestic supply wells. Some wells may no longer be active, and many active wells may not be recorded in DGLS databases. Table 5 illustrates the breakdown of private wells within four miles of the site (Reference 43). The population served by private wells was calculated using the estimated average persons per household in Camden County - 2.41 (Reference 48).

| **TABLE 5: PRIVATE WELLS REGISTERED WITH DNR WITHIN A 4-MILE RADIUS OF THE FORMER HULETT LAGOON SITE** | | |
|---|---|---|
| Distance From Site | Number of Private Wells | Estimated Population Served |
| 0 - 1/4 | 1 | 2 |
| 1/4 - 1/2 | - | - |
| 1/2 - 1 | 2 | 5 |
| 1-2 | 27 | 65 |
| 2-3 | 59 | 142 |
| 3-4 | 81 | 195 |
| TOTAL | 170 | 409 |

## 4.3 Previous Sampling

Monitoring Wells

Modine Manufacturing Company has performed quarterly sampling of the monitoring wells on their site. The TCE concentrations in the monitoring wells are detailed in the table below (Reference 49).

**TABLE 6: TCE CONCENTRATIONS IN MODINE GROUNDWATER MONITORING WELLS 1 - 5**
All results in parts per billion
NT - Not tested ND - Not detected at or above 5 ppb NS - Not sampled due to insufficient volume

| Date of Sampling | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 |
|---|---|---|---|---|---|
| 09/02/92 | ND | ND | These wells were not drilled until 1995. | | This well was not drilled until 1998. |
| 12/07/94 | 6.9 | 5.1 | | | |
| 08/16,22/95 | 11.8 | ND | 8 | 88.9 | |
| 11/16/95 | 9.4 | ND | ND | 142 | |
| 02/15,16/96 | ND (duplicate 5.4) | ND | 6.6 | 173 | |
| 05/16/96 | ND | ND | ND | 10 | |
| 08/20/96 | ND | NT | ND | NS | |
| 12/12/96 | ND | NT | NS | NS | |
| 02/28/96, 03/0397 | NT | NT | ND | 34 | |
| 06/04/97 | NT | NT | NT | 120 | |
| 07/16/98 | These wells were not sampled at this time. This was during the installation of MW-5. | | | | 484.1 |

Public Drinking Water

Table 7, on the following page, shows the history of TCE detections in the City of Camdenton's public drinking water wells. The first time TCE showed up in the Mulberry well was in March of 1993. The sample was collected by the Missouri Department of Health and analyzed at Continental Analytical Services, Inc. (Reference 50).

The DNR requires public drinking water wells be tested for volatile organic compounds every three years. DNR mails sampling containers to the public water supply office, and then a designee, in the City of Camdenton's case, the Public Works Director, collects the sample and sends it to DNR for analysis. When a contaminant is detected, sampling frequency is then increased to quarterly and sometimes monthly. If the running annual average concentration of the contaminant exceeds the MCL, the public system is in violation of the drinking water standard.

The first sample analyzed by DNR in which TCE was detected at the Mulberry well was in January 1997. During sampling in 1997, there was only one sample that exceeded the MCL (February's sample was 5.2 ppb), but the running annual average for that year was below the MCL. In 1998, the levels of TCE began to increase (Reference 50). At that time, the city began looking at options to replace the Mulberry Well. In May 1998, the city

announced they were in the process of planning for a new well to be drilled on Hickory Street to replace the Mulberry Well (Reference 51). In addition, in July 1998, the City of Camdenton installed new regulating controls on their drinking water wells that allowed them to cut back the usage of the Mulberry Well. It went from supplying about 70% of the water when blended with the other two wells, to supplying about 40%. In February 1999, the new Hickory well went on line and the Mulberry well was shut off (Reference 45).

**TABLE 7: TCE RESULTS FROM SAMPLING AT CITY OF CAMDENTON'S PUBLIC DRINKING WATER WELLS**
Results in parts per billion

| Date of Sampling | Mulberry Well | Rodeo Well | Blair Well |
|---|---|---|---|
| 03/16/93 | 2.1 | <0.5 | <0.5 |
| 04/27/94 | <0.5 | <0.5 | <0.5 |
| 01/29/97 | 3.8 | 3.9* | <0.5 |
| 02/17/97 | 5.2 | <0.5 | <0.5 |
| 03/12/97 | 3.8 | <0.5 | <0.5 |
| 06/03/97 | 4.5 | <0.5 | <0.5 |
| 08/26/97 | 4.3 | <0.5 | <0.5 |
| 12/01/97 | 4.4 | <0.5 | <0.5 |
| 02/02/98 | 6.3 | <0.5 | <0.5 |
| 02/17/98 | 5.2 | <0.5 | <0.5 |
| 03/25/98 | 3.6 | <0.5 | <0.5 |
| 04/23/98 | 4.1 | <0.5 | <0.5 |
| 05/21/98 | 11.8 | <0.5 | <0.5 |
| 06/08/98 | 5.1 | <0.5 | <0.5 |
| 08/25/98 | 4.2 | <0.5 | <0.5 |
| 12/02/98 | 4.4 | <0.5 | <0.5 |
| 01/13/99 | 26.2 | <0.5 | <0.5 |

* The Rodeo well is over one mile from the Hulett lagoon. It is unknown whether this TCE detection was a valid result, especially since all subsequent samples were non-detect for TCE.

<u>Private Wells</u>

On April 23, 1998, DNR collected a groundwater grab from a private well at 178 Sunset Drive. The sample was analyzed for VOCs. Cis-1,2-dichlorethene was detected at 12 ppb and TCE was detected at 210 ppb. At that time, the owner was using the well only for lawn watering; the home was hooked up to the city water line for drinking water (Reference 52).

In July 1992, as part of the SI conducted at the 179 Sunset Drive facility, three samples were collected from private wells located near the Lake of the Ozarks. Two of the wells were located in Normac Estates, 1.8 miles west-southwest of the site. The third well was located 1.3 miles southwest of the site. No VOCs were detected in any samples (Reference 36).

## 4.4 Sampling Locations

Groundwater samples for the PA/SI were collected on January 6-7, 1999. Five monitoring wells, two public water supply wells, and two private drinking water wells were sampled. Figure 3 shows sample locations for all groundwater samples collected as part of the Hulett Lagoon PA/SI (Reference 38).

<u>Monitoring Wells 1 & 2</u>
Layne-Western Company, Inc., was subcontracted by DNR for the installation of Monitoring Wells #1 and #2 on the Modine Manufacturing Company property (then known as Modine Heat Transfer). The wells were installed in July 1992 during the SI performed at the 179 Sunset Drive facility. MW-1 is located on the west side of the facility. MW-2 is located northeast of the facility. Total well depth of MW-1 was 178 feet and MW-2 was 197 feet. The wells were constructed with two-inch diameter, polyvinyl chloride (PVC) inner well casing, with steel outer well casing. Both wells have 40 feet of screen at the bottom of the well (References 36; 53).

On January 7, 1999, sample 991464 was collected from MW-1 and sample 991463 was collected from MW-2. Depth to water recorded at 153.2 feet from the top of the casing in MW-1. Depth to water recorded at 165.7 feet from the top of the casing in MW-2 (Reference 38).

<u>Monitoring Wells 3 & 4</u>
Layne-Western Company, Inc. of St. Louis was subcontracted by Dames & Moore, consultant for Modine Manufacturing Company, for the installation of Monitoring Wells #3 and #4. Drilling took place from August 8-14, 1995. MW-3 was installed on August 8, 1995, south of the Modine facility. MW-4 was installed on August 11, 1995, just northwest of the facility. MW-3 is 167 feet deep with 64 feet of five-inch diameter steel surface casing. MW-4 is 158 feet deep with 44 feet of five-inch diameter steel surface casing. Both wells are open hole below their casing (Reference 54, p. 35).

On January 7, 1999, sample 991460 was collected from MW-3 and samples 991461 and 991462 were collected from MW-4. Sample 991461 was collected via a submersible pump and 991462 was collected via dedicated bailer. The two different methods for collection were used for comparison purposes. All other groundwater samples from monitoring wells were collected with a dedicated bailer. Depth to water recorded at 153.1 feet from the top of the casing in MW-3. Depth to water recorded at 158.5 feet from the top of the casing in MW-4 (Reference 38).

<u>Monitoring Well 5</u>
Layne-Western Company, Inc. of St. Louis was subcontracted by Dames & Moore, consultant for Modine Manufacturing Company, for the installation of Monitoring Well #5. The well was installed just outside what would have been the southwest edge of berm of the Hulett lagoon. Drilling took place from July 7-10, 1998. The well was installed to

determine the presence or absence of volatile organic compounds, in particular, TCE, in the groundwater underlying the former Hulett lagoon. The well was drilled to a total depth of 118 feet below ground surface (bgs). Permanent surface casing was installed in bedrock to a depth of 37 feet bgs. This was done to case off several void spaces that had been encountered during drilling, most notably a void space from 35.0 to 36.5 feet bgs. The well was constructed with schedule 80, two-inch diameter, PVC casing with 30 feet of a 0.01 inch slotted screen. Water was encountered at a depth of 105 feet bgs (Reference 55).

On January 7, 1999, samples 991465 and 991466 (duplicate) were collected from MW-5. Depth to water recorded at 102.7 feet from the top of the casing in MW-5 (Reference 38).

Public Wells

Sample #991458 was collected from the City of Camdenton Blair well. The Blair well was considered a background well for PA/SI purposes since previous sampling has shown this well not to be contaminated. However, groundwater flow direction has not been definitively determined; the cones of depression created by the city's wells could significantly affect groundwater flow in the area. Sample #991459 was collected from the City of Camdenton Mulberry well, known to be contaminated with TCE (Reference 38).

Private Wells

Sample 991452 and 991453 (a duplicate) were collected from a residential well, located at 178 Sunset Drive, approximately 790 feet southwest of the site. This well is currently not used for any purpose. When the well was sampled in April 1998 and found to be contaminated with TCE, the owner discontinued use, which at that time was only for watering his lawn. No information is known about the well (Reference 38).

Sample 991457 was collected from a residence in Normac Estates, located 1.8 miles west-southwest of the site on the lakefront of the Lake of the Ozarks. No information is known about the well (Reference 38).

### 4.5 Analytical Results (Reference 38)

All groundwater samples for the PA/SI were analyzed for total and/or dissolved metals (arsenic, barium, cadmium, chromium, copper, mercury, nickel, lead, selenium, silver), and VOCs. The analytical results for all groundwater samples are detailed in the tables on the following page.

Monitoring Wells

| TABLE 8: SELECTED GROUNDWATER RESULTS FROM PA/SI SAMPLING AT MODINE MONITORING WELLS 1 - 5 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| All results in parts per billion NA - not analyzed<br>* 991461 was collected via submersible pump, 991462 was collected via dedicated bailer<br>Bolded results are those above the EPA MCL. | | | | | | | | |
| CHEMICAL | MW-1 | MW-2 | MW-3 | MW-4 | | MW-5 | | EPA |
| | 991464 | 991463 | 991460 | 991461* | 991462* | 991465 | 991466 | MCL |
| METALS | | | | | | | | |
| Arsenic, total | <1.2 | <1.2 | 6 | <1.2 | NA | <1.2 | <1.2 | 50 |
| Barium, dissolved | 49.7 | 91 | 69.6 | 81.6 | NA | 55.7 | 51.6 | 2000 |
| Barium, total | 58.2 | 112 | 151 | 88.3 | NA | 67.9 | 71.3 | |
| Cadmium, total | <1.0 | <1.0 | 2.26 | <1.0 | NA | 1.25 | 1.97 | 5 |
| Chromium, total | 3.84 | 14.3 | 45.7 | 5.52 | NA | 9.39 | 13.3 | 100 |
| Copper, total | 6.94 | 7.85 | 51.2 | <5.0 | NA | 7.52 | 8.97 | 1300 |
| Nickel, total | <3.0 | 8.45 | 29.7 | 7.61 | NA | 5.16 | 4.26 | 100 |
| Lead, total | 14.1 | **37.2** | **97.6** | **38.7** | NA | 12.7 | **15.3** | 15 |
| VOCs | | | | | | | | |
| Cis-1,2-dichloroethene | <0.5 | <0.5 | <0.5 | 2.1 | 2.3 | 35 | 23 | 70 |
| Trichloroethene | **10.1** | 2.5 | <0.5 | **64.1** | **76.5** | **1400** | **1500** | 5 |

For purposes of the PA/SI and according to HRS guidelines, any of MW's 1 through 4 could be considered background for the MW-5. Although previous and current sampling has shown that MW's 1 through 4 have been, or presently are, within the boundaries of the TCE plume, the TCE contamination in MW-5 exceeds three times the TCE concentration in any of the other monitoring wells. Additionally, however, all five monitoring wells are not entirely similar in construction. MW's 3 and 4 are open hole borings below their casing, while MW's 1, 2 are screened for 40 feet; MW-5 is screened for 30 feet. MW-1 is 60 feet deeper than MW-5; and MW-2 is 79 feet deeper than MW-5. Although the intervals from which water is drawn in the monitoring wells is not entirely similar, all five wells draw water from the Gasconade Dolomite formation of the Ozark Aquifer.

Public and Private Drinking Water Wells

| TABLE 9: SELECTED GROUNDWATER RESULTS FROM PA/SI SAMPLING AT PUBLIC AND PRIVATE GROUNDWATER WELLS | | | | | | |
|---|---|---|---|---|---|---|
| All results in parts per billion | | | | | | |
| CHEMICAL | Camdenton Blair Well (Background) | Camdenton Mulberry Well | Sunset Drive Private Well | | Normac Estates Private Well | EPA MCL |
| | 991458 | 991459 | 991452 | 991453 | 991457 | |
| METALS | | | | | | |
| Barium, total | 45.3 | 45.3 | 67.5 | 66.6 | 62.8 | 2000 |
| Copper, total | 21.7 | 31.7 | 27.5 | 16.3 | 44.7 | 1300 |
| Nickel, total | <3.0 | <3.0 | 11.2 | 60.4 | <3.0 | 100 |
| Lead, total | 4.4 | **15.7** | <2.5 | <2.5 | <2.5 | 15 |
| VOCs | | | | | | |
| Cis-1,2-dichloroethene | <0.5 | <0.5 | 13 | 13 | <0.5 | 70 |
| Trichloroethene | <0.5 | **5.3** | **240** | **230** | <0.5 | 5 |

For purposes of the PA/SI, the Camdenton Blair well was chosen as a background well for the contaminated Mulberry well. The two wells are similar in total depth and both draw from the Potosi Dolomite formation of the Ozark Aquifer. The Mulberry well could in fact serve as its own background since the well was regularly monitored as a public well under Missouri regulations, and was non-detect for TCE until 1997 (except for one sample in 1993 collected by the Missouri Department of Health).

### 4.6 Conclusions

PA/SI sampling has documented an observed release of TCE to the Ozark Aquifer in the area of the Former Hulett Lagoon site. MW-5, located immediately near the lagoon, contained TCE at 1,400 ppb. The City of Camdenton's Mulberry well, located less than 0.25 of a mile south of the lagoon showed 5.3 ppb TCE during PA/SI sampling on January 6, 1999.

The City of Camdenton officially took the Mulberry Well off line on February 2, 1999 due to the TCE contamination. When in use during the initial time period when TCE was detected, the Mulberry Well was the highest producing well of Camdenton's system, supplying an apportioned 2,107 people. The well is now a reserve well, to be used only when power is down at any other Camdenton Wells. There are three wells currently serving the city within two miles of the site. The City of Camdenton's drinking water wells supply an estimated 3,010 people.

There are two sources of TCE that could be attributed to the contamination present in the City of Camdenton's Mulberry Well. PA/SI sampling has shown the former Hulett lagoon contains TCE contaminated soil, as well as groundwater, at the lagoon site. The lagoon is located approximately 1100 feet north of the Mulberry well. The manufacturing facility at 179 Sunset Drive has also been shown to contain TCE contaminated soil as well as TCE contaminated groundwater. The facility is located approximately 500 feet northwest of the Mulberry Well. It is unknown at this time whether the Mulberry Well contamination is due in whole or in part to the lagoon contamination. Information on groundwater flow direction is inconclusive. DNR's DGLS geologists suggest that the cone of depression created by the Mulberry well, when in operation, influenced groundwater flow in that direction. Now that the Mulberry well has been shut off, groundwater flow is expected to move toward another city well, most likely the Blair well.

## 5.0 SURFACE WATER PATHWAY

### 5.1 Hydrologic Setting

The site is situated within the Salem Plateau region of the Ozark Plateau physiographic province. The topography of the Salem Plateau is characterized by a rolling upland surface with rugged hills dissected by entrenched, narrow stream valleys. Karst features,

such as springs, sinkholes, and losing streams, are characteristic of the Salem Plateau (Reference 43).

The Former Hulett Lagoon site is situated near the headwaters of a small unnamed stream which drains southwest to the Niangua Arm of the Lake of the Ozarks. During operation, the Hulett lagoon's receiving stream was identified as a tributary to Jarvis Hollow. The site of the former lagoon has been leveled, while the surrounding terrain exhibits moderate natural relief (5% to 9% slopes). East of the site lies the City of Camdenton. West of the site, the landscape is more rugged, and forests extend down to the Lake of the Ozarks. The natural landforms and drainage patterns at the site have been obscured by lagoon construction and, later, by soil removal actions (Reference 43).

Below the site, the receiving stream is fairly steep and the bedload consists mostly of cobbles and gravel. In 1992, a DGLS geologist with the Water Resources Program examined area streams as part of oversight for an investigation at the 179 Sunset Drive facility. He reported that the Former Hulett Lagoon site is located on the valley floor of the "northeast branch" of an unnamed tributary to Jarvis Hollow. The "southeast branch" of the tributary drains the facility at 179 Sunset Drive. The northeast and southeast branches join near the western corporate boundary of the City of Camdenton, approximately 0.6 miles downstream of the Former Hulett Lagoon site. The lagoon was constructed near the headwaters of the northeast branch, just west of the ridge top where most of Camdenton is located. Water runs onto the site from the upper section of the northeast branch. This channel has been diverted around the northern edge of the former lagoon (Reference 43).

Run-off from the site, entering the northeast branch, flows toward the west for ¼ mile. Runoff then flows southwest approximately 1.6 miles and enters Jarvis Hollow in the NE ¼, NE ¼, SE1/4 of Section 34, Township 38 North, Range 17 West. According to the 7.5 minute HaHaTonka topographic map, the 0.15-mile-long stream segment below this confluence appears to be perennial. Thus, the confluence of the unnamed tributary and the stream in Jarvis Hollow is considered the probable point of entry (PPE) to surface water. Runoff from the Former Hulett Lagoon reaches the Lake of the Ozarks 1.97 miles downstream of the site (Reference 43).

The DGLS geologist noted that the unnamed tributary lost flow in some locations, especially when encountering the Gunter Sandstone. However, it was anticipated that any flow lost in the streambed would stay in the valley. Very little rainfall is necessary to generate surface flow throughout the reach of the stream. The receiving stream for the Former Hulett Lagoon Site has not been officially classified by DGLS, but based on available reports, the stream should be considered losing. The Gasconade Dolomite that forms much of the streambed is not particularly karst. Many nearby streams have been classified as losing (Reference 43).

The 15-mile downstream limit ends near Shepard Cove on the Osage River Arm of the Lake of the Ozarks, approximately 29.5 miles above Bagnell Dam. This point is located

on the Camdenton, MO 7.5-minute quadrangle; SE ¼, Section 24, T. 39 N., R. 17 W. The Osage River flows in a northeasterly direction, toward the Missouri River (References 43; 3).

The site is most likely not located in a flood plain, as it is located at an elevation of approximately 285 meters above mean sea level, while Lake of the Ozarks is at 198 meters above sea level (Reference 3).

## 5.2 Surface Water Targets

The Lake of the Ozarks is a 59,520 acre lake classified as a major reservoir. The lake is designated for use as livestock and wildlife watering, protection of warm water aquatic life and human health/fish consumption, whole body contact recreation, and boating and canoeing (Reference 56, pp. 11, 35). There are no drinking water intakes on the Lake of the Ozarks (Reference 46, p. 200).

The federally-listed Endangered gray bat is known to occur on the Lake of the Ozarks in Section 2 of T 38 N, R 18 W. The bats forage over streams, rivers, and reservoirs in this part of Missouri (Reference 57).

The federally-listed threatened Bald Eagle winters at the Lake of the Ozarks. Bald eagles generally forage on fish, dead and dying waterfowl, and carrion. Eagles can be adversely affected by heavy metals, bacteria, and other contaminants. Due to the scavenger behaviors of the eagle, they often feed on dead or dying prey that may have been poisoned in some way or may have elevated bacterial levels. In such cases, eagles can be affected through a secondary pathway in the food chain which could harm or kill individuals (Reference 58).

According to National Wetlands Inventory maps prepared by the U.S. Department of the Interior/Fish and Wildlife Service (aerial photography from 1984), the first 0.6 of a mile of the creek bordering the lagoon is a wetland. The remaining portion of the creek leading to the Lake of the Ozarks may be considered a wetland if emergent hydrophytes are present. There are numerous wetlands in and bordering the Lake of the Ozarks (Reference 59).

## 5.3 Surface Water Conclusions

All surface runoff from the lagoon area enters the tributary to Jarvis Hollow stream that borders the west side of the lagoon. This stream received overflow from the lagoon during operation; thus TCE was historically released to the creek. However, the stream bed near the site is gravel, making sampling impractical. It has been ten years since the lagoon was closed; it is unlikely any TCE would be left in any surface material, soil or sediment, present in other parts of the stream. Since TCE is a DNAPL, the majority of what entered the stream would have infiltrated into the subsurface by now. Current site conditions

indicate the risk from any site surface runoff would be low since the TCE found in the soil at the lagoon was from the four to seven foot depth.

## 6.0 SOIL EXPOSURE AND AIR PATHWAYS

### 6.1 Physical Conditions

The native soil in the vicinity of the Former Hulett Lagoon site was the Clarksville-Gepp very cherty silt loam. The Clarksville-Gepp soils are deep, well-drained soils typical of sloping uplands. Permeability is moderate. The content of organic material is moderately low. The shrink-swell potential is moderate. Grass at the site limits wind erosion (Reference 43).

The one acre former lagoon area is an open field area with grassy vegetation. The only structure on-site is Monitoring Well #5, located on the southwest corner of the lagoon's former berm. The lagoon area is relatively flat. During closure, the majority of the sludge was removed and the berms were turned into the middle. Apparently, some of the material from the hill bordering the southeast and east side of the lagoon was scraped in toward the lagoon during closure, but no fill was brought in (Reference 5).

Access is not restricted to the site; there is no fencing. The gravel access road from West Mulberry is not maintained; there are several severe ruts caused from washouts. There have been reports that illegal dumping is occurring on Ron Hulett property along the north and south side of the access road. There were a few pieces of trash in the lagoon area (Reference 5).

### 6.2 Soil and Air Targets

Residential areas are located immediately north and south of the site. North of the site is an apartment complex; south of the site is one apartment building and several homes. At least two of the apartment buildings in the complex north of the site are within 200 feet of the site, as well as the apartment building and one home south of the site (Reference 5).

The City of Camdenton has an estimated population of 2,544 people (Reference 48, p. 144). Table 10, on the following page, illustrates the breakdown of the number of people estimated to be within a four-mile radius of the site (Reference 60).

| TABLE 10: ESTIMATED POPULATION WITHIN A 4-MILE RADIUS | |
|---|---|
| RADIUS | POPULATION |
| ON-SITE | 0 |
| 0 - 1/4 | 180 |
| 1/4 - 1/2 | 696 |
| 1/2 - 1 | 1,267 |
| 1 - 2 | 1,100 |
| 2 - 3 | 1,280 |
| 3 - 4 | 1,405 |
| TOTAL | 5,928 |

The federally-listed Endangered gray bat is known to occur in Section 2 of T37N, R17W, which is between 2 and 3 miles from the site (Reference 57).

### 6.3 Soil and Air Conclusions

All soil samples collected as part of the PA/SI were waste/source samples. The TCE contamination in the lagoon is documented in the four to seven foot depth zone. There were no surface soil samples collected from the lagoon area because the majority of the sludge in the lagoon was removed and the majority of TCE near the surface would have volatilized or moved down through the soil profile in the ten years since closure of the lagoon. The potential for possible trespasser exposure to any of the TCE contaminated soil on the site is considered minimal. There are no people living on site, although there are three apartment buildings and one home that are within 200 feet of the site. Access to the site is not restricted. The reports of unauthorized dumping in the area near the lagoon indicate site security may be warranted.

## 7.0 SUMMARY AND CONCLUSIONS

The Former Hulett Lagoon site is located in the City of Camdenton, 500 feet northeast of the intersection of Dawson Road and Sunset Drive. The site is a closed wastewater lagoon owned and operated by the City of Camdenton. The Hulett lagoon, approximately one acre in size, was one of five municipal lagoons that serviced the City of Camdenton. It was the only lagoon that received industrial effluent in addition to domestic sewage. The lagoon was in operation from 1961 until its closure in late 1989.

From 1967 through 1986, Dawson Metal Products (1967 to 1972) and Sundstrand Tubular Products (1972 to 1986) operated a manufacturing facility that released untreated wastewater into the lagoon. The facility is located approximately 1000 feet southeast of the lagoon at 179 Sunset Drive. The untreated wastewater was known to have contained

several hazardous waste streams, most notably TCE. During closure in 1989, over 2,000 pounds of sludge was removed from the lagoon.

Environmental investigations of the manufacturing facility at 179 Sunset Drive started in 1990 when Modine Manufacturing Company was considering buying the property. About that time DNR received a complaint alleging that 4,500 gallons of TCE had been spilled at the facility. Since that time, there have been numerous investigations conducted at the 179 Sunset Drive facility, including a PA and SI conducted by DNR. The current owner, Modine Manufacturing Company, is presently negotiating a Resource Conservation and Recovery Act (RCRA) Corrective Action Abatement Order on Consent (AOC) through the Permits Section of DNR's HWP. The AOC calls for investigation to determine the nature and extent of contamination on the facility property. However, investigation of the Hulett Lagoon could not be included in the AOC due to a RCRA domestic sewage exemption. Thus, the Former Hulett Lagoon site was referred to Superfund to be addressed under CERCLA.

Waste/Source Sampling

Although over 2,000 cubic yards of sludge were removed from the lagoon during closure in 1989, PA/SI sampling, as well as previous sampling, document that TCE contaminated soil still remains in the lagoon area. Three samples, collected for the PA/SI near the previous location of the outfall pipe, contained TCE at 9.5 ppm, 0.24 ppm and 0.12 ppm. With such high levels of TCE documented in groundwater at the site (1,400 ppb), it is presumed that the majority of TCE, once deposited in the lagoon, has infiltrated into the bedrock. However, the TCE contaminated soil that remains in the lagoon may be a continuing source of contamination.

Groundwater

PA/SI sampling has documented an observed release of TCE to the Ozark Aquifer in the area of the Former Hulett Lagoon site. MW-5, located immediately near the lagoon, contained TCE at 1,400 ppb. The City of Camdenton's Mulberry well, located less than 0.25 of a mile south of the lagoon showed 5.3 ppb TCE during PA/SI sampling. The Mulberry well was taken off line on February 2, 1999 due to the TCE contamination. When in use during the initial time period when TCE was detected, the Mulberry Well was the highest producing well of Camdenton's system, supplying an apportioned 2,107 people. There are three wells currently serving the city within two miles of the site. It is estimated that the TCE groundwater plume will begin moving toward the city's Blair well now that the Mulberry well has been shut off. The cone of depression created by pumping the Blair well, located 0.7 of a mile south-southwest, may influence the migration of the plume. The City of Camdenton's drinking water wells supply an estimated 3,010 people.

In addition to the Hulett lagoon, there is another source of TCE contamination that could be contributing to the groundwater plume that affected the City of Camdenton's Mulberry well. The manufacturing facility at 179 Sunset Drive has also been shown to contain TCE contaminated soil as well as TCE contaminated groundwater. The facility is located

approximately 500 feet northwest of the Mulberry Well. It is unknown at this time whether the Mulberry Well contamination is due in whole or in part to the lagoon contamination.

Surface Water
All surface runoff from the lagoon area enters the tributary to Jarvis Hollow stream that borders the west side of the lagoon. This stream received overflow from the lagoon during operation; thus TCE was historically released to the creek. However, the streambed near the site is gravel, making sampling impractical. It has been ten years since the lagoon was closed; it is unlikely any TCE would be left in any surface material, soil or sediment, present in other parts of the stream. Current site conditions indicate the risk from any site surface runoff would be low since the TCE found in the soil at the lagoon was from the four to seven foot depth.

Soil and Air
The potential for possible trespasser exposure to any of the TCE contaminated soil on the site is considered minimal. There are no people living on site, although there are three apartment buildings and one home that are within 200 feet of the site. Access to the site is not restricted. The reports of unauthorized dumping in the area near the lagoon indicate site security may be warranted.

## 8.0 RECOMMENDATIONS

The TCE groundwater contamination at the Former Hulett Lagoon site warrants remedial action. The contamination has already caused the closure of the one of the city's public drinking water wells, and the remaining wells are now at risk. Hydraulic control will need to be achieved at the source of the plume to prevent the migration of TCE to the other nearby wells, specifically the Blair well. Current investigation and remedial actions are ongoing at the 179 Sunset Drive facility, however, these activities do not include and will not address the Hulett lagoon contamination.

Although the majority of the sludge from the lagoon was removed, TCE contaminated soil remains. This contaminated soil may warrant removal. At a minimum, access to the site should be restricted.

Using the Hazard Ranking System (HRS) to evaluate site conditions, the Former Hulett Lagoon site scores above 28.5 and qualifies for proposal to the National Priorities List (NPL). The closing of a public drinking water supply well due to contamination from the site is a significant factor in this site evaluation.

Prepared by: Valerie H. Wilder

Valerie H. Wilder
Environmental Specialist
Site Evaluation Unit

Reviewed by: Julieann Warren

Julieann Warren
Chief
Site Evaluation Unit

Approved by:

Gary T. Behrns
Chief
Superfund Section

## REFERENCES

1. U.S. Environmental Protection Agency Hazard Ranking System, 40 CFR Part 300, Appendix A, 55 FR 51583, December 14, 1990.

2. U.S. Environmental Protection Agency, September, 1995, Superfund Chemical Data Matrix.

3. U.S. Geological Survey, 7.5-Minute Series. Topographic Maps. Camdenton, MO 1983, Decaturville, MO 1975, Green Bay Terrace 1983, HaHaTonka, 1982.

4. Missouri Department of Natural Resources, DEQ, Appendix A. Locational Data Collection Sheet. January 21, 1999. 2 pages.

5. Wilder, Valerie H., Environmental Specialist, HWP, DEQ, DNR to Former Hulett Lagoon and Camdenton Sludge Disposal Technical Files. Memo. Site Visits/Sampling Events on December 1, 16, 1998 and January 21-22, 29, 1999. February 1, 1999. 3 pages.

6. United States Department of Agriculture. Soil Conservation Service. Soil Survey of Camden County, Missouri. March 1994. 127 pages.

7. United States Department of Commerce. National Weather Service Office for State Climatology. Technical Paper No. 40. Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years. 1961.

8. United States Department of Commerce. Climatic Atlas of the United States. June 1968.

9. Jacobs Engineering Group, Inc. Final Environmental Priorities Initiative/Preliminary Assessment. Modine Heat Transfer, Inc. (Formerly Sundstrand Tubular Products) September 1992. 58 pages plus Figures, Tables, and Appendices.

10. Missouri Department of Natural Resources. Missouri Water Quality Basin Plans. Volume 4. Osage and Gasconade Rivers (Including Lake of the Ozarks, Truman Reservoir, South Grand, Little Osage, Marmaton, Marais des Cygnes, Sac and Pomme de Terre Rivers, Tebo Creek and Big Piney River). 102 pages.

11. B. R. Kesler, Regional Administrator, DEQ, JCRO to Trudy Marco, Grants Coordinator, Camdenton, MO. Audit Report and Checklist. June 20, 1986. 13 pages.

12. Victoria M. Haines, Environmental, Health & Safety Counsel, Sundstrand to Valerie Wilder, HWP, DEQ, DNR. Letter. February 5, 1999. 7 pages plus Attachments.

13. State of Delaware, Office of Secretary of State. Certificate of Incorporation, Dawson Metal Products, Inc. June 12, 1972. 1 page

14. State of Missouri, James C. Kirkpatrick, Secretary of State. Certificate of Authority, Dawson Metal Products, Inc. No. F-157085. September 25, 1972. 1 page.

15. State of Missouri, Office of Secretary of State. Application for an Amended Certificate of Authority for a Foreign Corporation, Sundstrand Tubular Products, Inc., (formerly Dawson Metal) May 25, 1977. 2 pages.

16. Missouri Department of Natural Resources. Corrective Action Abatement Order on Consent to Modine Manufacturing Company, 179 Sunset Drive, PO Box 636, Camdenton, MO 65020. 20 pages.

17. State of Missouri, Roy D. Blunt, Secretary of State. Certificate of Withdrawal, Sundstrand Tubular Products, Inc. No. F00157085. April 18, 1991. 1 page.

18. Law Environmental, Inc. Project No. 53-1543. Environmental Site Assessment, Modine Heat Transfer, Inc. November 1991. 5 pages plus Tables, Figures and Appendices.

19. Todd Crawford, Environmental Engineer to the Honorable Ken Mensendiek, Mayor, City of Camdenton. Letter. September 13, 1978. 1 page.

20. John W. Whitfield, Geologist and Gary St. Ivany, Lab Technician, applied Engineering & Urban Geology. Engineering Geologic Report on Collapse Potential of Camdenton Lagoons. September 14, 1978. 1 page.

21. James O. Jackson, P.E. to Frank Dolan, P.E., Environmental Engineer, DNR. Letter. Test Results from Camdenton. June 21, 1984. 7 pages.

22. Warren W. Riley, Jr., City Administrator, City of Camdenton to Frank Dolan, DNR. Letter. Second Sample Results. August 20, 1984. 4 pages.

23. Donald Roger Elder, City Administrator, City of Camdenton to Leora M. Reising, Environmental Specialist, JCRO, DNR. Letter. May 27, 1986. 1 page.

24. Missouri Department of Natural Resources, Missouri Clean Water Commission. Construction Permit. Permit Number 2263. 2 pages.

25. Missouri Department of Natural Resources, Laboratory Services Program, DEQ. Pretreatment Monitoring Report, Sundstrand Tubular Products, Inc. April 30, 1987. 3 pages.

26. Charles Ray, Missouri Engineering Corp. to Dave Friese, Water Pollution Control Program, DNR. Letter. Sludge Analysis Report. April 25, 1988. 1 page.

27. David Freise, P.E., Project Engineer to the Honorable Mac Webster, Mayor, City of Camdenton. Letter. IDG - 011 Camdenton, MO Lagoon Closure. May 26, 1988. 1 page.

28. David Freise, P.E., Project Engineer to the Honorable Mac Webster, Mayor, City of Camdenton. Letter. IDG - 011 Hulett Lagoon. November 2, 1989. 1 page.

29. Missouri Engineering Corporation. Specifications and Contract Documents Removal and Stockpiling of Sludge from the Hulett Lagoon Camdenton, Missouri. March 1989. 17 pages.

30. Charles Ray, Missouri Engineering Corporation. Sludge Removal Project Hulett Lagoon - Camdenton, MO. July 21, 1989. 2 pages.

31. Kay Cyrus to Camdenton City Council. Regarding November 1, 1989, letter from Charles Ray, Missouri Engineering Corporation to Dave Welch, Attorney. 3 pages.

32. Ron McCormick to Mr. Hixson and Council Members. Letter. Cost Overrun in the Hulett Lagoon Project. October 20, 1989. 1 page.

33. Kent L. Hixson, City of Camdenton to Ronnie Testerman, DNR. Letter. Hulett Lagoon Sludge Disposal Work Completion Summary. April 9, 1990. 1 page.

34. Kent L. Hixson, City Administrator, City of Camdenton to Paul Kieler, Jacobs Engineering Group. Letter. Hulett Lagoon Closure Process. March 23, 1992. 1 page.

35. Department of Natural Resources, HWP. Preliminary Assessment Sundstrand Camden County, Missouri. January 31, 1992. 10 pages.

36. Missouri Department of Natural Resources, Environmental Services Program. Site Sampling Report Sundstrand Site Camdenton MO July 20 through July 31, 1992. December 31, 1992. 41 pages.

37. Arthur H. Groner, Chief, Permits Section, HWP, DEQ, DNR to Gary Behrns, Chief, Superfund Section, HWP, DEQ, DNR. Former Hulett Lagoon, Camdenton, Missouri September 8, 1998. 4 pages.

38. Allen, Brian J., Missouri Department of Natural Resources, Environmental Services Program. Combined Preliminary Assessment/Site Inspection Sampling Report Former Hulett Lagoon Site Camdenton, Missouri, Camden County. Field Activities Conducted January 6-7, 1999, January 21, 1999. 44 pages.

39. U.S. Department of Health & Human Services. Public Health Service. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Trichloroethylene. February 20, 1996. 261 Pages.

40. Office of Emergency & Remedial Response, U.S. EPA. Estimating Potential for Occurrence of DNAPL at Superfund Sites. January 1992. 9 Pages.

41. Miesche M. Francis, Assistant Geologist, and Daniel J. Price, P.G., Senior Geologist, Dames and Moore to Richard Nussbaum, P.E., Groundwater Enforcement Unit Chief, HWP, DEQ, DNR. Letter Report. Subsurface Investigation Former Hulett Lagoon Camdenton Missouri Dames & Moore Job NO. 27397-023-045 November 4, 1996. 22 pages.

42. Missouri Department of Natural Resources, Division of Environmental Quality, Hazardous Waste Program. Cleanup Levels for Missouri (CALM). September 1998. 31 pages plus Appendices, Figures, Tables and Attachments.

43. Elfrink, Neil, Geologist, Environmental Geology Section, GSP, DGLS, DNR to Valerie Wilder, Environmental Specialist, Superfund Section, HWP, DEQ, DNR. Memo. Hydrogeologic Report for the Former Hulett Lagoon Site. March 12, 1999. 11 pages.

44. CARES, University of Missouri - Columbia and Missouri Department of Natural Resources, Public Drinking Water Program. Public Drinking Water Map - Camdenton 3010130, 6 Wells, 2 Chemical Sites, 1 Dealership, Camden County. February 24, 1999. 4 pages.

45. Vincent Costa, Director of Public Works, to Valerie Wilder, HWP, DEQ, DNR. Letter. February 24, 1999. 3 pages.

46. Missouri Department of Natural Resources, Division of Environmental Quality. Inventory of Missouri Public Water Systems. 1998. 211 pages.

47. CARES, University of Missouri - Columbia and Missouri Department of Natural Resources, Public Drinking Water Program. Public Drinking Water Map - Camden County, Missouri. January 1996.

48. U.S. Department of Commerce, Bureau of the Census. 1990 Census of Population and Housing. Summary Population and Housing Characteristics, Missouri. 1990 CPH-1-27. August 1991. 2 pages.

49. Thomas S. Sanicola, Environmental Engineer, Modine Manufacturing to Darleen Westcott, Environmental Engineer, HWP, DEQ, DNR. Letter. July 2, 1997. 9 pages.

50. Continental Analytical Services, Inc., and DNR Environmental Services Program. Sample Results. March 16, 1993. 42 pages.

51. Miller, Joyce L. Lake Sun-Leader, Camdenton, MO. Newspaper Article. Plant Under DNR Gun. May 23, 1998. 1 page.

52. Department of Natural Resources, Environmental Services Program. RCRA Sampling Investigation Report. Modine Site - Burnau Private Well, Camdenton, MO. April 23, 1998. 8 pages.

53. Starbuck, Edie. Division of Geology and Land Survey. Monitoring Well Installation for Sundstrand PA/SI. Geologic Drill Log. November 9, 1994. 8 pages.

54. Kump, Chris, Environmental Engineer, Groundwater Unit, Hazardous Waste Program, DNR. Comprehensive Groundwater Monitoring Evaluation, Modine Manufacturing Company, Camdenton, Missouri. January 1998. 44 pages plus Appendices.

55. Price, Daniel J., R.G., Managing Principal, St. Louis Office, Dames & Moore to Mr. Thomas S. Sanicola, Environmental Engineer, Modine Manufacturing Company. Final Letter Report, Subsurface Investigation, Monitoring Well Installation - Former Hulett Lagoon, Camdenton, Missouri, Dames & Moore Project No. 27397-035-045. October 19, 1998. 7 pages plus attachments.

56. Code of State Regulations, Rules of Department of Natural Resources, Division 20-Clean Water Commission, Chapter 7-Water Quality. Water Quality Standards, 10 CSR 20-7.031, March 30, 1994. 114 Pages.

57. Lyon, Mary, Policy Analyst, Missouri Department of Conservation to Julie Kelsey, Environmental Specialist, DNR. Former Hulett Lagoon. Letter. December 14, 1998. 1 page with enclosure.

58. Wilson, Mark R., Field Supervisor, Fish & Wildlife Service, United State Department of the Interior to Julie B. Kelsey, DNR, DEQ. Letter. December 18, 1998. 4 pages.

59. United States Department of the Interior, Fish and Wildlife Service. Green Bay Terrace, MO and HaHaTonka, MO Quadrangles. National Wetlands Inventory Maps. Aerial Photography April 1984. Maps Dated 1993.

60. Marble/Geocorr Geographic Correspondence Engine. Census Count Information. Internet address: http://www.oseda.missouri.edu/plue/geocorr/.

61. CARES, University of Missouri - Columbia and Missouri Department of Natural Resources, Public Drinking Water Program. Public Drinking Water Map - Windsor Estates Nursing Home, 3069006, 1 Well, 0 Contaminant Sites, 0 Dealerships, Camden County. October, 2, 1996. 2 pages.

62. CARES, University of Missouri - Columbia and Missouri Department of Natural Resources, Public Drinking Water Program. Public Drinking Water Map - Linn Creek, 3010471, 1 Well, 0 Contaminant Sites, 0 Dealerships, Camden County. October, 2, 1996. 2 pages.

63. CARES, University of Missouri - Columbia and Missouri Department of Natural Resources, Public Drinking Water Program. Public Drinking Water Map - Southway Terrace MHP, 3048141, 1 Well, 0 Chemical Sites, 0 Dealerships, Camden County. October, 2, 1996. 2 pages.

# APPENDIX A
# FIGURES

Figure 1: Site Location Map
Former Hulett Lagoon Site
Camden County, Missouri

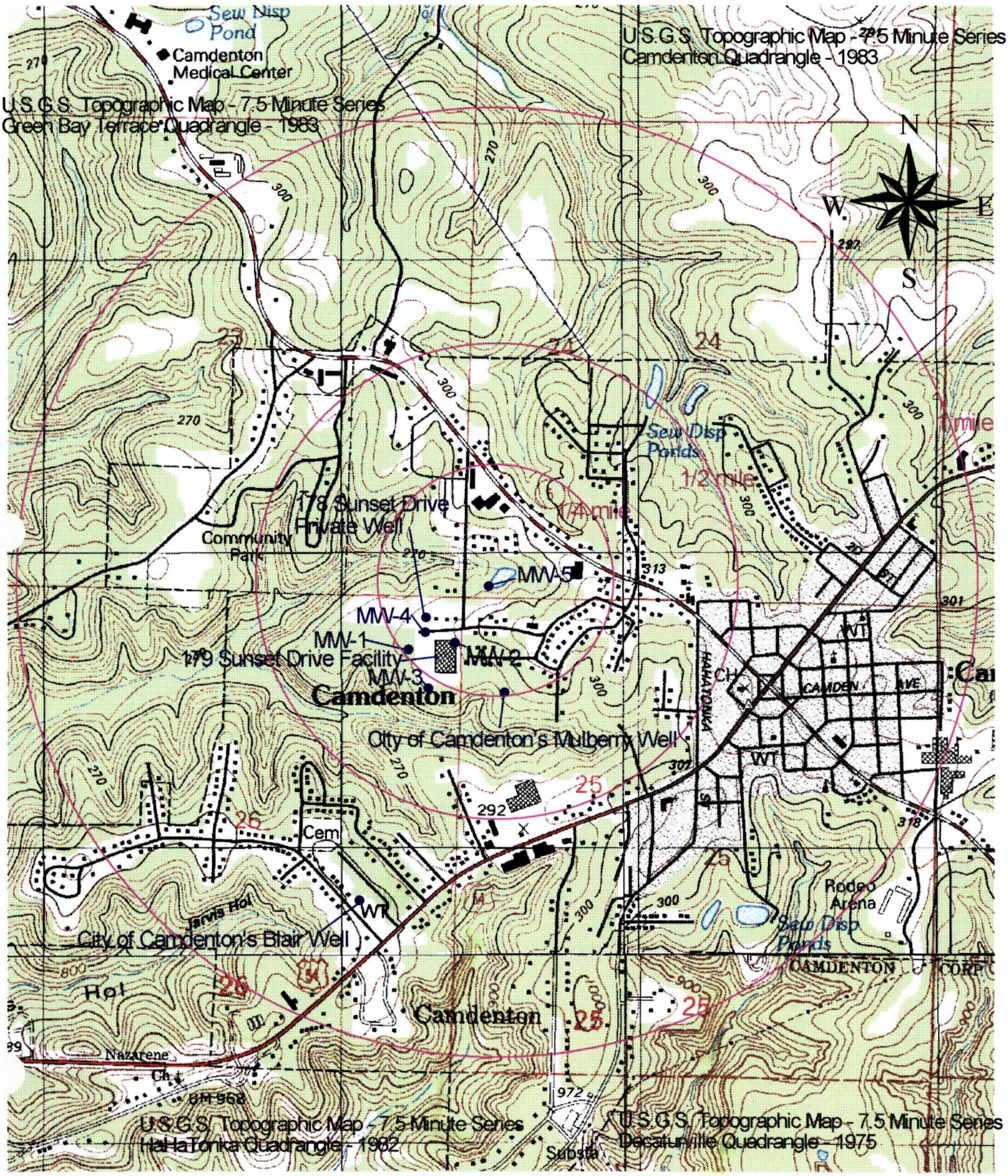
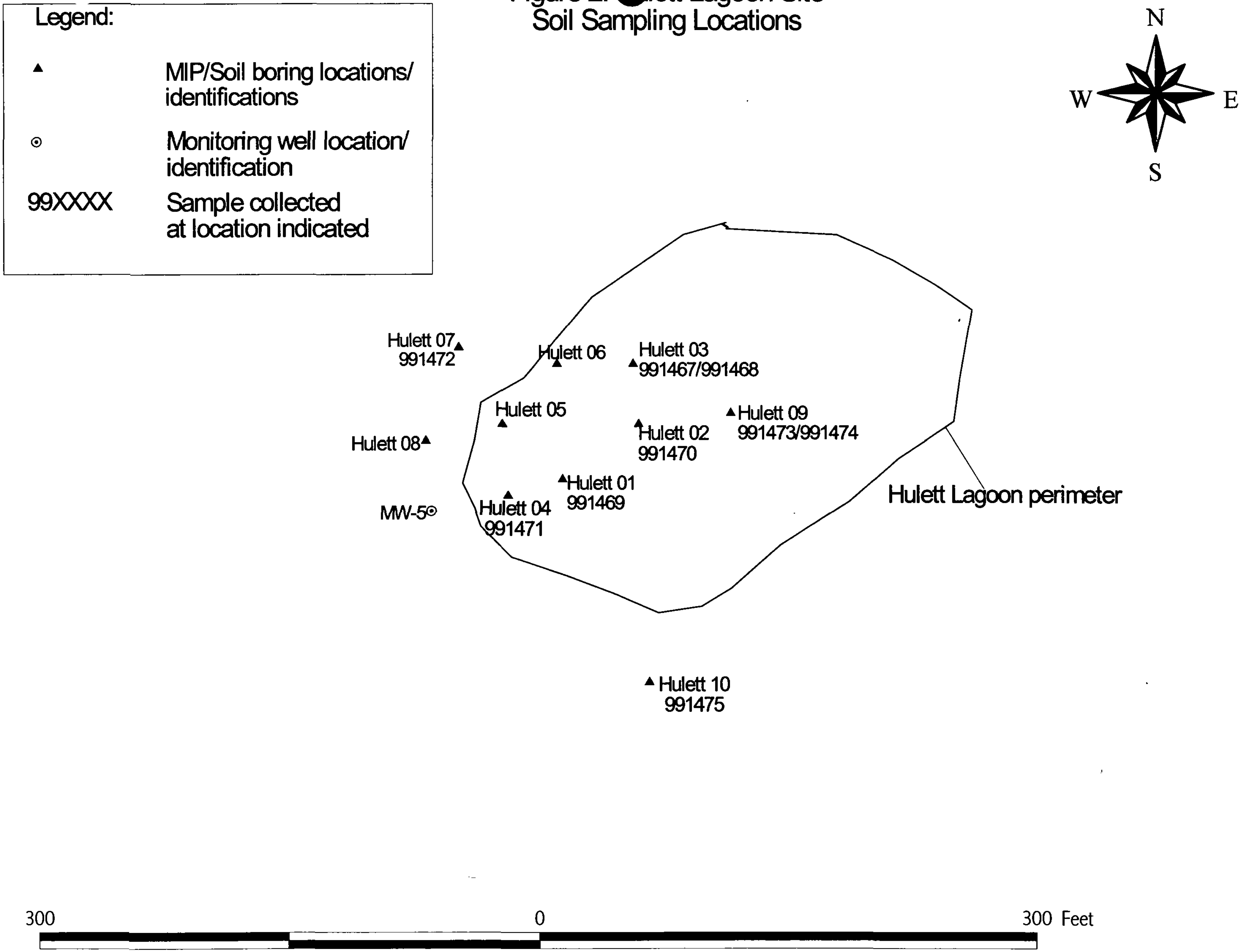
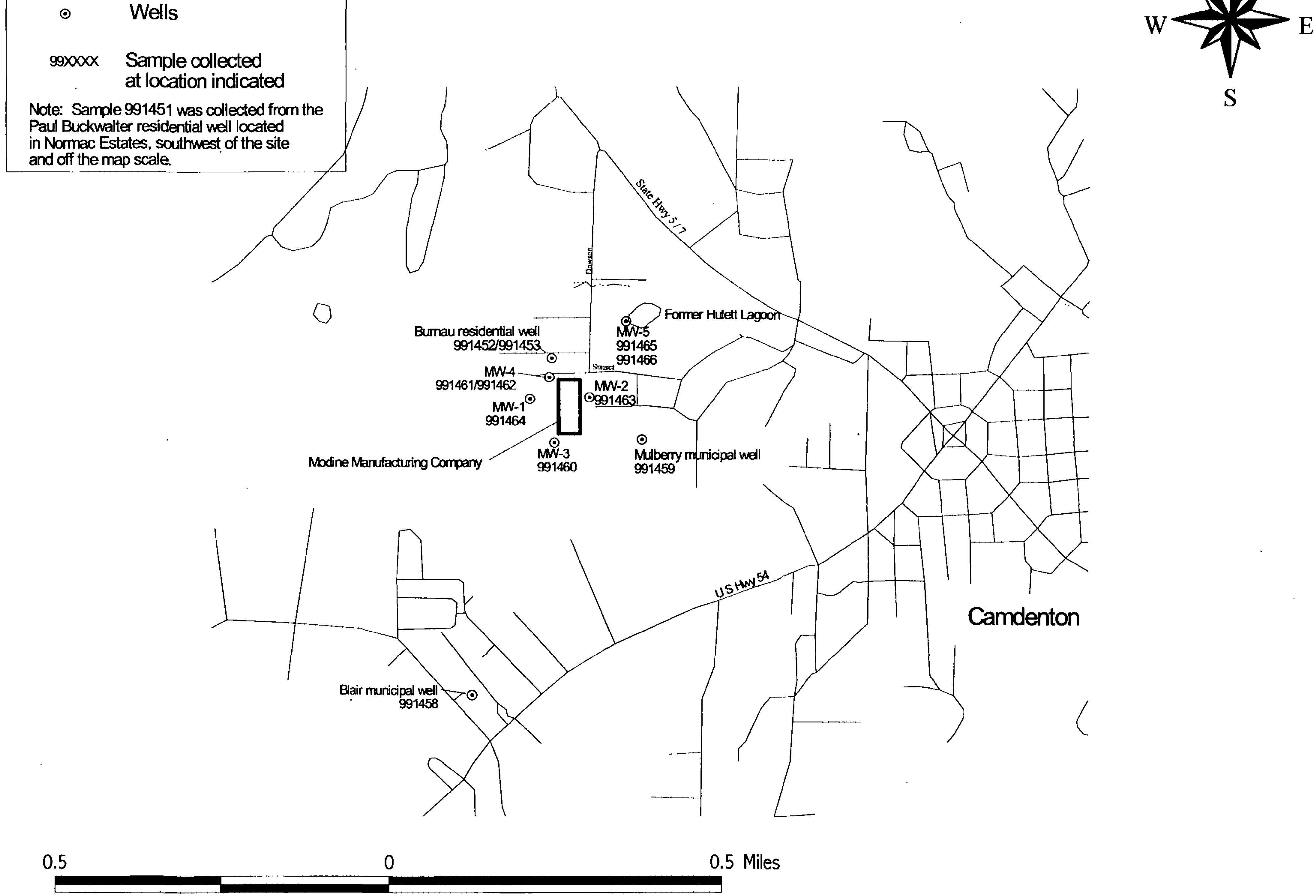


Figure 2: Hulett Lagoon Site
Soil Sampling Locations



## Figure 3: [illegible]tt Lagoon Site Well Sampling Locations



# PHOTOGRAPHS

**PHOTO 1**

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 10/1/74 by Ronnie Testerman, MDNR, JCRO. View looking northeast at the Hulett lagoon during operation. The northern portion of the lagoon shown in the photo was where influent from domestic sewage entered the lagoon. A small amount of the sludge from the Sundstrand influent, which came in on the south portion of the lagoon can be seen in the foreground of the photo near the wooden catwalk.

**PHOTO 2**

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 10/1/74 by Ronnie Testerman, MDNR, JCRO. View looking east at the Hulett lagoon during operation. The picture was taken to show the sludge settling around the influent pipe area from Sundstrand.

**PHOTO 3**

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken sometime in June or July 1989 by Ronnie Testerman, MDNR, JCRO. View looking northeast at the Hulett lagoon during the beginning of the closure process. The dewatering had begun, but no sludge had been removed.

**PHOTO 4**

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 12/1/98 by Valerie Wilder, MDNR, Superfund. View looking northeast at the former lagoon. Remnants of the road that was around the lagoon on its berm can be seen in the foreground.

**PHOTO 5**

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 12/1/98 by Valerie Wilder, MDNR, Superfund. Photo taken looking north at the hillside west of the lagoon. The apartment complex buildings north of the lagoon can be seen through the trees.

**PHOTO 6**

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 12/1/98 by Valerie Wilder, MDNR, Superfund. Photo taken looking south-southeast. The road surrounding the lagoon on the berm is seen in the right-hand side of the photo. The former lagoon was in the area in the left-hand side of the photo.

**PHOTO 7**

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 1/21/99 by Valerie Wilder, MDNR, Superfund. Photo taken looking northeast at Geoprobe work during PA/SI sampling.

**PHOTO 8**

Former Hulett Lagoon Site. Camdenton, MO, Camden County. Photo taken on 1/21/99 by Valerie Wilder, MDNR, Superfund. Photo taken looking north-northeast at Geoprobe work during PA/SI sampling. The apartment complex north of the lagoon can be seen through the trees.

# PRESCORE

PREscore 4.1
NPL Characteristics Data Collection Form

Record Information
ííííííííííííííííííí

1. Site Name: Former Hulett Lagoon
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: Valerie H. Wilder

4. Date: 3/26/99

5. Site Location: Camdenton/Camden, MO
   (City/County,State)

6. Congressional District: 4

7. Site Coordinates: Single

   Latitude: 92ø45'17.0"          Longitude: 038ø00'41.1"

Site Description
ííííííííííííííííí

1. Setting: Urban

2. Current Owner: Municipal

3. Current Site Status: Inactive

4. Years of Operation: Inactive Site,from and to dates: 1961-1989

5. How Initially Identified: RCRA Notification

6. Entity Responsible for Waste Generation:

   - Manufacturing
     - Fabr. Struc. Metal Prod.

7. Site Activities/Waste Deposition:

   - Surface Impoundment
   - Discharge to Sewer/Surface Water

## Waste Description
íííííííííííííííííí

8. Wastes Deposited or Detected Onsite:

   - Solvents

## Response Actions
íííííííííííííííí

9. Response/Removal Actions:

   - Drinking Water Well Has Been Closed

## RCRA Information
íííííííííííííííí

10. For All Active Facilities, RCRA Site Status:

    - Not Applicable

## Demographic Information
íííííííííííííííííííííííí

11. Workers Present Onsite: No

12. Distance to Nearest Non-Worker Individual: > 10 Feet - 1/4 Mile

13. Residential Population Within 1 Mile: 2143.0

14. Residential Population Within 4 Miles: 5928.0

## Water Use Information
ííííííííííííííííííííííí

15. Local Drinking Water Supply Source:

    - Ground Water (within 4 mile distance limit)

16. Total Population Served by Local Drinking Water Supply Source: 3010.0

17. Drinking Water Supply System Type for Local Drinking Water Supply Sources:

HRS DOCUMENTATION RECORD

1. Site Name: Former Hulett Lagoon
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: Valerie H. Wilder

4. Date: 3/26/99

5. Site Location: Camdenton/Camden, MO
   (City/County,State)

6. Congressional District: 4

7. Site Coordinates: Single

   Latitude: 92ø45'17.0" Longitude: 038ø00'41.1"

| | Score |
|---|---|
| Ground Water Migration Pathway Score (Sgw) | 100.00 |
| Surface Water Migration Pathway Score (Ssw) | 0.00 |
| Soil Exposure Pathway Score (Ss) | 0.00 |
| Air Migration Pathway Score (Sa) | 0.00 |

| | |
|---|---|
| Site Score | 50.00 |

NOTE

Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

- Municipal (Services over 25 People)

18. Surface Water Adjacent to/Draining Site:

    - Stream

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Lagoon

| | |
|---|---|
| a. Wastestream ID | |
| b. Hazardous Constituent Quantity (C) (lbs.) | 0.00 |
| c. Data Complete? | NO |
| d. Hazardous Wastestream Quantity (W) (lbs.) | 0.00 |
| e. Data Complete? | NO |
| f. Wastestream Quantity Value (W/5,000) | 0.00E+00 |

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

| | | |
|---|---|---|
| a. Source ID | Lagoon | |
| b. Source Type | Surface Impoundment | |
| c. Secondary Source Type | N.A. | |
| d. Source Vol.(yd3/gal) \| Source Area (ft2) | 0.00 | 5445.00 |
| e. Source Volume/Area Value | 4.19E+02 | |
| f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b) | 0.00E+00 | |
| g. Data Complete? | NO | |
| h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f) | 0.00E+00 | |
| i. Data Complete? | NO | |
| k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h) | 4.19E+02 | |

| Source Hazardous Substances | Depth (feet) | Liquid | Concent. | Units |
|---|---|---|---|---|
| Trichloroethylene | > 2 | YES | 1.2E-01 | ppm |

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

| No. | Source ID | Migration Pathways | Vol. or Area Value (2e) | Constituent or Wastestream Value (2f,2h) | Hazardous Waste Qty. Value (2k) |
|---|---|---|---|---|---|
| 1 | Lagoon | GW-SW-SE-A | 4.19E+02 | 0.00E+00 | 4.19E+02 |

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

| Migration Pathway | Contaminant Values | | HWQVs* | WCVs** |
|---|---|---|---|---|
| Ground Water | Toxicity/Mobility | 1.00E+01 | 100 | 6 |
| SW: Overland Flow, DW | Tox./Persistence | 4.00E+00 | 100 | 3 |
| SW: Overland Flow, HFC | Tox./Persis./Bioacc. | 2.00E+02 | 100 | 10 |
| SW: Overland Flow, Env | Etox./Persis./Bioacc. | 2.00E+03 | 100 | 18 |
| SW: GW to SW, DW | Tox./Persistence | 4.00E+00 | 100 | 3 |
| SW: GW to SW, HFC | Tox./Persis./Bioacc. | 2.00E+02 | 100 | 10 |
| SW: GW to SW, Env | Etox./Persis./Bioacc. | 2.00E+03 | 100 | 18 |
| Soil Exposure:Resident | Toxicity | 0.00E+00 | 0 | 0 |
| Soil Exposure: Nearby | Toxicity | 0.00E+00 | 0 | 0 |
| Air | Toxicity/Mobility | 1.00E+01 | 100 | 6 |

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

# HRS DOCUMENTATION RECORD

1. Site Name: Former Hulett Lagoon
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: Valerie H. Wilder

4. Date: 3/26/99

5. Site Location: Camdenton/Camden, MO
   (City/County,State)

6. Congressional District: 4

7. Site Coordinates: Single

   Latitude: 92ø45'17.0" Longitude: 038ø00'41.1"

| | Score |
|---|---|
| Ground Water Migration Pathway Score (Sgw) | 100.00 |
| Surface Water Migration Pathway Score (Ssw) | 0.00 |
| Soil Exposure Pathway Score (Ss) | 0.00 |
| Air Migration Pathway Score (Sa) | 0.00 |

| | |
|---|---|
| Site Score | 50.00 |

NOTE

Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Lagoon

| | |
|---|---|
| a. Wastestream ID | |
| b. Hazardous Constituent Quantity (C) (lbs.) | 0.00 |
| c. Data Complete? | NO |
| d. Hazardous Wastestream Quantity (W) (lbs.) | 0.00 |
| e. Data Complete? | NO |
| f. Wastestream Quantity Value (W/5,000) | 0.00E+00 |

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

| | | | |
|---|---|---|---|
| a. Source ID | | Lagoon | |
| b. Source Type | | Surface Impoundment | |
| c. Secondary Source Type | | N.A. | |
| d. Source Vol.(yd3/gal) | Source Area (ft2) | 0.00 | 5445.00 |
| e. Source Volume/Area Value | | 4.19E+02 | |
| f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b) | | 0.00E+00 | |
| g. Data Complete? | | NO | |
| h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f) | | 0.00E+00 | |
| i. Data Complete? | | NO | |
| k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h) | | 4.19E+02 | |

| Source Hazardous Substances | Depth (feet) | Liquid | Concent. | Units |
|---|---|---|---|---|
| Trichloroethylene | > 2 | YES | 1.2E-01 | ppm |

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

| No. | Source ID | Migration Pathways | Vol. or Area Value (2e) | Constituent or Wastestream Value (2f,2h) | Hazardous Waste Qty. Value (2k) |
|---|---|---|---|---|---|
| 1 | Lagoon | GW-SW-SE-A | 4.19E+02 | 0.00E+00 | 4.19E+02 |

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

| Migration Pathway | Contaminant Values | | HWQVs* | WCVs** |
|---|---|---|---|---|
| Ground Water | Toxicity/Mobility | 1.00E+01 | 100 | 6 |
| SW: Overland Flow, DW | Tox./Persistence | 4.00E+00 | 100 | 3 |
| SW: Overland Flow, HFC | Tox./Persis./Bioacc. | 2.00E+02 | 100 | 10 |
| SW: Overland Flow, Env | Etox./Persis./Bioacc. | 2.00E+03 | 100 | 18 |
| SW: GW to SW, DW | Tox./Persistence | 4.00E+00 | 100 | 3 |
| SW: GW to SW, HFC | Tox./Persis./Bioacc. | 2.00E+02 | 100 | 10 |
| SW: GW to SW, Env | Etox./Persis./Bioacc. | 2.00E+03 | 100 | 18 |
| Soil Exposure:Resident | Toxicity | 0.00E+00 | 0 | 0 |
| Soil Exposure: Nearby | Toxicity | 0.00E+00 | 0 | 0 |
| Air | Toxicity/Mobility | 1.00E+01 | 100 | 6 |

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note:
SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

PREscore 4.1
HRS DOCUMENTATION RECORD

1. Site Name: Former Hulett Lagoon
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: Valerie H. Wilder

4. Date: 3/26/99

5. Site Location: Camdenton/Camden, MO
   (City/County,State)

6. Congressional District: 4

7. Site Coordinates: Single

   Latitude: 92ø45'17.0" Longitude: 038ø00'41.1"

| | Score |
|---|---|
| Ground Water Migration Pathway Score (Sgw) | 100.00 |
| Surface Water Migration Pathway Score (Ssw) | 0.00 |
| Soil Exposure Pathway Score (Ss) | 0.00 |
| Air Migration Pathway Score (Sa) | 0.00 |

| | |
|---|---|
| Site Score | 50.00 |

NOTE

Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Lagoon

| | |
|---|---|
| a. Wastestream ID | |
| b. Hazardous Constituent Quantity (C) (lbs.) | 0.00 |
| c. Data Complete? | NO |
| d. Hazardous Wastestream Quantity (W) (lbs.) | 0.00 |
| e. Data Complete? | NO |
| f. Wastestream Quantity Value (W/5,000) | 0.00E+00 |

WASTE QUANTITY

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

| | | | |
|---|---|---|---|
| a. Source ID | | Lagoon | |
| b. Source Type | | Surface Impoundment | |
| c. Secondary Source Type | | N.A. | |
| d. Source Vol.(yd3/gal) | Source Area (ft2) | 0.00 | 5445.00 |
| e. Source Volume/Area Value | | 4.19E+02 | |
| f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b) | | 0.00E+00 | |
| g. Data Complete? | | NO | |
| h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f) | | 0.00E+00 | |
| i. Data Complete? | | NO | |
| k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h) | | 4.19E+02 | |

| Source Hazardous Substances | Depth (feet) | Liquid | Concent. | Units |
|---|---|---|---|---|
| Trichloroethylene | > 2 | YES | 1.2E-01 | ppm |

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

| No. | Source ID | Migration Pathways | Vol. or Area Value (2e) | Constituent or Wastestream Value (2f,2h) | Hazardous Waste Qty. Value (2k) |
|---|---|---|---|---|---|
| 1 | Lagoon | GW-SW-SE-A | 4.19E+02 | 0.00E+00 | 4.19E+02 |

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

| Migration Pathway | Contaminant Values | | HWQVs* | WCVs** |
|---|---|---|---|---|
| Ground Water | Toxicity/Mobility | 1.00E+01 | 100 | 6 |
| SW: Overland Flow, DW | Tox./Persistence | 4.00E+00 | 100 | 3 |
| SW: Overland Flow, HFC | Tox./Persis./Bioacc. | 2.00E+02 | 100 | 10 |
| SW: Overland Flow, Env | Etox./Persis./Bioacc. | 2.00E+03 | 100 | 18 |
| SW: GW to SW, DW | Tox./Persistence | 4.00E+00 | 100 | 3 |
| SW: GW to SW, HFC | Tox./Persis./Bioacc. | 2.00E+02 | 100 | 10 |
| SW: GW to SW, Env | Etox./Persis./Bioacc. | 2.00E+03 | 100 | 18 |
| Soil Exposure:Resident | Toxicity | 0.00E+00 | 0 | 0 |
| Soil Exposure: Nearby | Toxicity | 0.00E+00 | 0 | 0 |
| Air | Toxicity/Mobility | 1.00E+01 | 100 | 6 |

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

HRS DOCUMENTATION RECORD

1. Site Name: Former Hulett Lagoon
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: Valerie H. Wilder

4. Date: 3/26/99

5. Site Location: Camdenton/Camden, MO
   (City/County,State)

6. Congressional District: 4

7. Site Coordinates: Single

   Latitude: 92ø45'17.0" Longitude: 038ø00'41.1"

| | Score |
|---|---|
| Ground Water Migration Pathway Score (Sgw) | 100.00 |
| Surface Water Migration Pathway Score (Ssw) | 0.00 |
| Soil Exposure Pathway Score (Ss) | 0.00 |
| Air Migration Pathway Score (Sa) | 0.00 |

| | |
|---|---|
| Site Score | 50.00 |

NOTE

Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Lagoon

| | |
|---|---|
| a. Wastestream ID | |
| b. Hazardous Constituent Quantity (C) (lbs.) | 0.00 |
| c. Data Complete? | NO |
| d. Hazardous Wastestream Quantity (W) (lbs.) | 0.00 |
| e. Data Complete? | NO |
| f. Wastestream Quantity Value (W/5,000) | 0.00E+00 |

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

| | | |
|---|---|---|
| a. Source ID | Lagoon | |
| b. Source Type | Surface Impoundment | |
| c. Secondary Source Type | N.A. | |
| d. Source Vol.(yd3/gal) / Source Area (ft2) | 0.00 | 5445.00 |
| e. Source Volume/Area Value | 4.19E+02 | |
| f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b) | 0.00E+00 | |
| g. Data Complete? | NO | |
| h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f) | 0.00E+00 | |
| i. Data Complete? | NO | |
| k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h) | 4.19E+02 | |

| Source Hazardous Substances | Depth (feet) | Liquid | Concent. | Units |
|---|---|---|---|---|
| Trichloroethylene | > 2 | YES | 1.2E-01 | ppm |

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

| No. | Source ID | Migration Pathways | Vol. or Area Value (2e) | Constituent or Wastestream Value (2f,2h) | Hazardous Waste Qty. Value (2k) |
|---|---|---|---|---|---|
| 1 | Lagoon | GW-SW-SE-A | 4.19E+02 | 0.00E+00 | 4.19E+02 |

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

| Migration Pathway | Contaminant Values | | HWQVs* | WCVs** |
|---|---|---|---|---|
| Ground Water | Toxicity/Mobility | 1.00E+01 | 100 | 6 |
| SW: Overland Flow, DW | Tox./Persistence | 4.00E+00 | 100 | 3 |
| SW: Overland Flow, HFC | Tox./Persis./Bioacc. | 2.00E+02 | 100 | 10 |
| SW: Overland Flow, Env | Etox./Persis./Bioacc. | 2.00E+03 | 100 | 18 |
| SW: GW to SW, DW | Tox./Persistence | 4.00E+00 | 100 | 3 |
| SW: GW to SW, HFC | Tox./Persis./Bioacc. | 2.00E+02 | 100 | 10 |
| SW: GW to SW, Env | Etox./Persis./Bioacc. | 2.00E+03 | 100 | 18 |
| Soil Exposure:Resident | Toxicity | 0.00E+00 | 0 | 0 |
| Soil Exposure: Nearby | Toxicity | 0.00E+00 | 0 | 0 |
| Air | Toxicity/Mobility | 1.00E+01 | 100 | 6 |

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

# DISPOSITION

| EPA | POTENTIAL HAZARDOUS WASTE SITE<br>TENTATIVE DISPOSITION | REGION<br>VII | SITE NUMBER |
|---|---|---|---|

File this form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency, Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, D.C. 20460.

## I. SITE IDENTIFICATION

| A. SITE NAME | B. STREET | |
|---|---|---|
| Former Hulett Lagoon | Dawson Road | |
| **C. CITY** | **D. STATE** | **E. ZIP CODE** |
| Camdenton | MO | 65020 |

## II. TENTATIVE DISPOSITION

Indicate the recommended action(s) and agency(ies) that should be involved by marking 'X' in the appropriate boxes.

| RECOMMENDATION | Mark 'X' | EPA | STATE | LOCAL | PRIVATE |
|---|---|---|---|---|---|
| A. NO ACTION NEEDED - NO HAZARD | | | | | |
| B. INVESTIGATIVE ACTION(S) NEEDED (If yes, complete Section III.) | | | | | |
| C. REMEDIAL ACTION (If yes, complete Section IV.) | X | | | | |
| D. ENFORCEMENT ACTION (If yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.) | | | X | | |

E. RATIONALE FOR DISPOSITION

Using the Hazard Ranking System (HRS) to evaluate site conditions, the Former Hulett Lagoon site scores above 28.5 and qualifies for proposal to the National Priorities List (NPL). The closing of a public drinking water supply well due to contamination from the site is a significant factor in this site evaluation.

| F. INDICATE THE ESTIMATED DATE OF FINAL DISPOSITION (mo,day,yr) | G. IF A CASE DEVELOPMENT PLAN IS NECESSARY, INDICATE THE ESTIMATED DATE ON WHICH THE PLAN WILL DEVELOPED (mo,day,yr) |
|---|---|
| September 1999 | |

H. PREPARER INFORMATION

| 1. NAME | 2. TELEPHONE NUMBER | 3. DATE (mo., day, & yr.) |
|---|---|---|
| Valerie Wilder | (573) 751-8629 | March 30, 1999 |

## III. INVESTIGATIVE ACTIVITY NEEDED

A. IDENTIFY ADDITIONAL INFORMATION NEEDED TO ACHIEVE A FINAL DISPOSITION.

The state will attempt to negotiate an agreement for site cleanup with the PRPs. If negotiations are not successful, the site will be recommended for listing on the NPL.

B. PROPOSED INVESTIGATIVE ACTIVITY (Detailed Information)

| 1. METHOD FOR OBTAINING NEEDED ADDITIONAL INFO. | 2. SCHEDULED DATE OF ACTION (mo,day,& yr) | 3. TO BE PERFORMED BY (EPA, Contractor, State, Etc.) | 4. ESTIMATED MANHOURS | 5. REMARKS |
|---|---|---|---|---|
| a. TYPE OF INSPECTION | | | | |
| (1) | | | | |
| (2) | | | | |
| b. TYPE OF MONITORING | | | | |
| (1) | | | | |
| (2) | | | | |
| c. TYPE OF SAMPLING | | | | |
| (1) | | | | |
| (2) | | | | |

Continued From Front

| | | | | |
|---|---|---|---|---|
| (1) | | | | |
| (2) | | | | |
| (1)<br>(2) | | | | |

C. ELABORATE ON ANY OF THE INFORMATION PROVIDED IN PART B(on front and above)AS NEEDED TO IDENTIFY ADDITIONAL INVESTIGATIVE WORK.

D. ESTIMATE MANHOURS BY ACTION AGENCY

| 1. ACTION AGENCY | 2. TOTAL ESTIMATED MANHOURS FOR INVESTIGATIVE ACTIVITIES | 1. ACTION AGENCY | 2. TOTAL ESTIMATED MANHOURS FOR INVESTIGATIVE ACTIVITIES |
|---|---|---|---|
| a. EPA | | b. STATE | |
| c. EPA CONTRACTOR | | d. OTHER (specify) | |

## IV. REMEDIAL ACTIONS

A. SHORT TERM/EMERGENCY ACTIONS (On Site and Off-Site): List all emergency actions needed to bring site under immediate control, e.g., restrict access, provide alternate water supply, etc. See instructions for a list of the actions to be used in the space below.

| 1. ACTION | 2. EST. START DATE mo, day, yr | 3. EST. END DATE mo, day, yr | 4. ACTION AGENCY EPA, State, Private Party | 5. ESTIMATED COST | 6. SPECIFY 311 OR OTHER ACTION; INDICATE THE MAGNITUDE OF THE WORK REQUIRED. |
|---|---|---|---|---|---|
| Excavation of TCE contaminated soil may be necessary | | | | $ | |
| | | | | $ | |
| | | | | $ | |
| | | | | $ | |
| | | | | $ | |
| | | | | $ | |

B. LONG TERM STRATEGY (On Site and Off-Site): List all long term solutions, e.g., excavation, removal, ground water monitoring wells, etc. See instructions for a list of Key Words for each of the actions to be used in the spaces below.

| 1. ACTION | 2. EST. START DATE mo, day, yr | 3. EST. END DATE mo, day, yr | 4. ACTION AGENCY EPA, State, Private Party | 5. ESTIMATED COST | 6.SPECIFY 311 OR OTHER ACTION; INDICATE THE MAGNITUDE OF THE WORK REQUIRED. |
|---|---|---|---|---|---|
| Groundwater cleanup of TCE plume | | | | $ | |
| | | | | $ | |
| | | | | $ | |
| | | | | $ | |
| | | | | $ | |
| | | | | $ | |

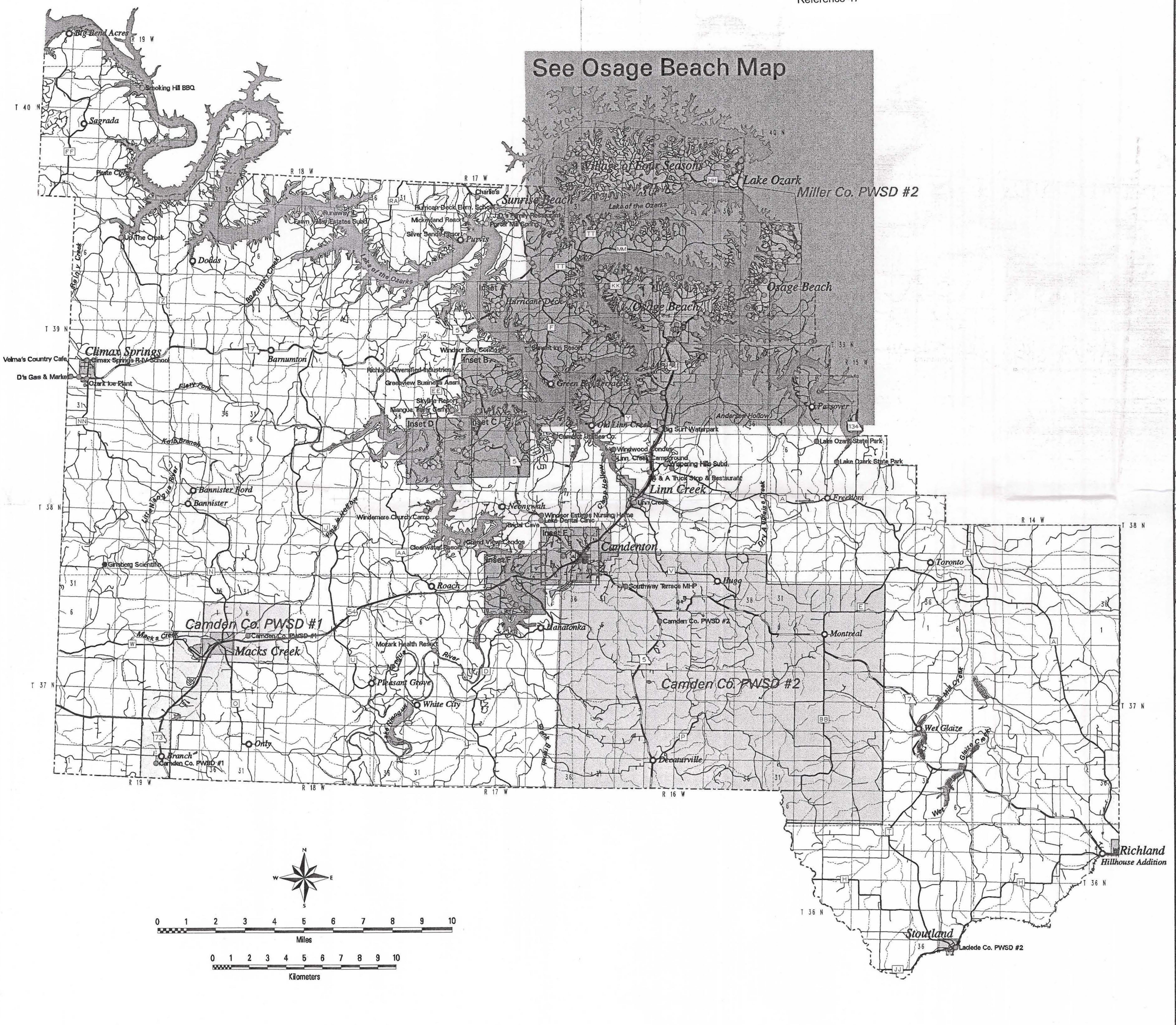
C. ESTIMATED MANHOURS AND COST BY ACTION AGENCY

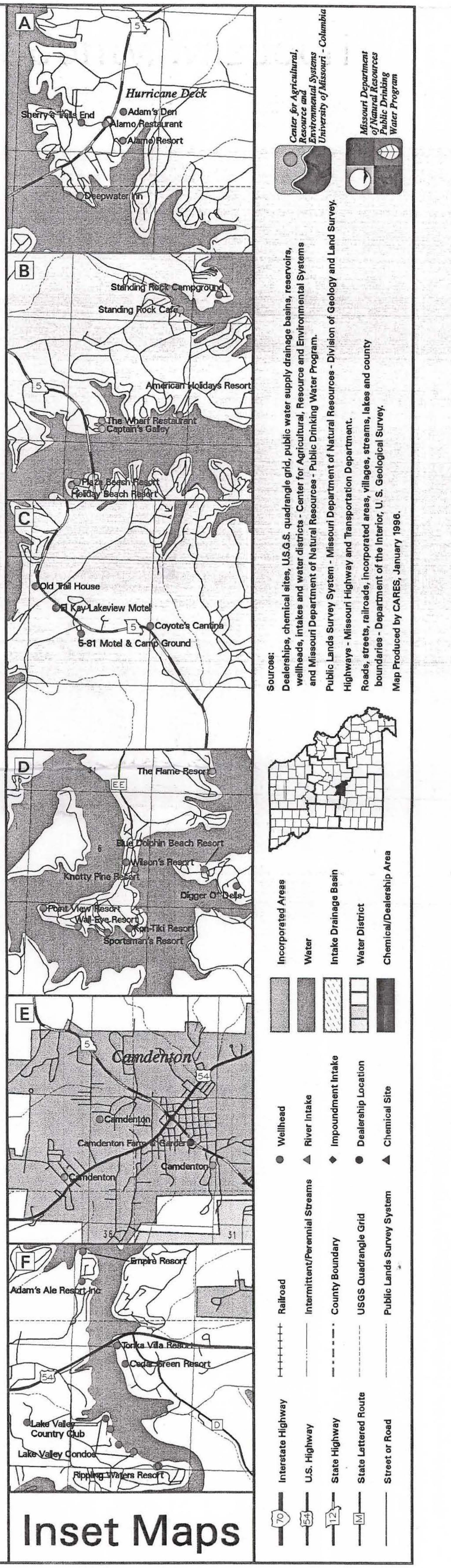
| 1. ACTION AGENCY | 2. TOTAL EST. MAN-HOURS FOR REMEDIAL ACTIVITIES | 3. TOTAL EST. COST FOR REMEDIAL ACTIVITIES | 1. ACTION AGENCY | 2. TOTAL EST. MAN-HOURS FOR REMEDIAL ACTIVITIES | 3. TOTAL EST. COST FOR REMEDIAL ACTIVITIES |
|---|---|---|---|---|---|
| a. EPA | | | b. STATE | | |
| c. PRIVATE PARTIES | | | d. OTHER (specify) | | |

# Former Hulett Lagoon Site
# U.S.G.S. Topographic Maps
# Reference 3

# Camden County, Missouri

Former Hulett Lagoon Site
Combined PA/SI
Reference 47



# Appendix A
## Department of Natural Resources
### Division of Environmental Quality
# Locational Data Collection Sheet

This sheet is used to record required locational data. Attach the ***Optional Locational Data Collection Sheet*** if you need to record additional information.

**1. Facility or Site** (Name and Address) Former Hulett Lagoon Site - 0.1 mile NE of intersection of Dawson Rd & Sunset Drive Camdenton, MO 65020

**2. Facility ID, Permit Number or Other Identifier**

**3. Data Owner** (1) DEQ/ADM (2) APCP (3) ESP (4) HWP (5) LRP (6) PDWP (7) SWCP (8) SWMP (9) TAP (10) WPCP Other:

| **4. Locational Data** (Leave blank for area features, such as roads, streams or site boundaries.) | Latitude | Longitude |
|---|---|---|
| **5. Unit of Measurement** (1) Degrees, Minutes, Seconds or (2) Decimal Degrees | 38.01143 | 92.75471 |

**6. Method of Determining Location** (Indicate the method used to determine the latitude and longitude coordinates.)

| **Address Matching** (Geocoding) | **Code** | | |
|---|---|---|---|
| Block/Group | A2 | Differential Post Processing | G3 |
| Digitization | A6 | Precise Positioning Service | G4 |
| Nearest Street Intersection | A4 | Signal Averaging | G5 |
| Other Address Matching | AO | Real Time Differential Processing | G6 |
| Primary Street Name | A5 | **Interpolation** | |
| Street Centerline | A3 | Aerial Photograph | I2 |
| Zip Code Centroid (Center) | Z1 | Map | I1 |
| **Census – 1990** | | Satellite Imagery | I3 |
| Block Centroid (Center) | C1 | Other Interpolation | IO |
| Block/Group Centroid | C2 | **Other** | |
| Block/Track Centroid | C3 | Classic Survey | S1 |
| Other Centroid | CO | Land Survey | P1 |
| **Global Positioning System** | | Loran C Code | L1 |
| Static Mode | G1 | Quarter Section Description | S2 |
| Kinematic Mode (Dynamic) | G2 | Unknown | UN |

**7. Locational Data Accuracy** (+/- meters) 38.1 ft

**8. Type of Locational Data Represented** (P) Single Point (L) Line (A) Area

**9. Horizontal Datum** (Indicate the horizontal datum used to locate the collection site feature.)

(1) NAD27, (2) NAD83, (3) WGS84, (U) Unknown Other:

# Appendix A
## Department of Natural Resources
### Division of Environmental Quality
# Locational Data Collection Sheet
Continued

**10. Collection Site Feature** (Mark the feature where the locational data was collected. If needed, use **11. Descriptive Comments** to provide more detail. Provide enough information so someone could return to the collection site feature.)

| Collection Site Feature | Code | | Code |
|---|---|---|---|
| Bridge | BR | Northeast Corner of the Facility or Site | NE |
| Building | BL | Northwest Corner of the Facility or Site | NW |
| Center of Facility or Site | CF | Pile | PL |
| Described by Descriptive Comment Field | DC | Pipe (Outfall, Intake, Point of Connection, Break, etc.) | OP |
| Described by Site Name | DS | Rail Road | RR |
| Equipment Point of Use | EU | Road | RD |
| Intersection (Road, Pipe, Street, etc.) | IN | Southeast Corner of the Facility or Site | SE |
| Lagoon or Pond | LS | Southwest Corner of the Facility or Site | SW |
| Loading Facility or Dock | LD | Stack | AS |
| Main Access Point (Entrance, Gate, etc.) | MG | Tank, Standpipe, Tower | TK |
| Main Office | MA | Vent | AV |
| Missouri Land Survey Monument | MM | Well | WL |
| Monitoring Station | AM | Unknown | UN |
| | | Other (use Collection Site Descriptive Comments below ) | OT |

Collection Site Descriptive Comments. (If needed, further describe the feature represented by the **Collection Site Feature**. For example, an outfa the east end of pipe 12; or started at the NW corner, went clockwise around the site, recorded 27 points and ended back at the starting point.)

Reading was collected in the center of the former lagoon

**11. Source of Locational Data**

| Description | Code | | | | | | |
|---|---|---|---|---|---|---|---|
| Citizen | CT | SWRO | D3 | LRP | N1 | EPA Headquarters | HQ |
| Contractor | CR | KCRO | D4 | PDWP | N2 | Private Sector | PV |
| Dun & Bradstreet | DB | NERO | D5 | SWCP | N3 | Regulated Entity | RE |
| EPA, Region 7 | R7 | SLRO | D6 | SWMP | N4 | Tribe | TR |
| JCRO | D1 | APCP | D7 | TAP | N5 | Unknown | UN |
| SERO | D2 | ESP | D8 | WPCP | N6 | | |
| | | HWP | D9 | DEQ/Adm | N7 | Other______ | |

**12. Source Scale Used to Determine the Latitude and Longitude**

| Scale | (U) Unknown | |
|---|---|---|

| **12. Your Name** (Please Print) | Valerie Wilder | **Your Phone** | (573) 522-3351 | **Date Collected** | 1/21/99 |
|---|---|---|---|---|---|

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

**MEMORANDUM**

DATE: February 1, 1999

TO: Former Hulett Lagoon and Camdenton Sludge Disposal Technical Files

FROM: Valerie H. Wilder, Environmental Specialist VW
Site Evaluation Unit, Superfund Section
Hazardous Waste Program

SUBJECT: Site Visits/Sampling Events on
December 1, 16, 1998 and January 21-22, 29, 1999

December 1, 1998, Site Visits

On December 1, 1998, I traveled to Camdenton, Missouri, to review city files on the former Hulett Lagoon. I went to City Hall and spoke with the mayor, Mr. Elmer Meyer. I made copies of the pertinent information on the operation and closure of the Hulett Lagoon. Mr. Tom Emry, Camdenton's Sewer Treatment Plant Manager, stopped by the city hall to answer some of my questions and help interpret maps. After reviewing the files, Mr. Vince Costa, Public Works Director, drove me around and showed me the former Hulett Lagoon, the sludge disposal area out near the airport, and all of the city's drinking water wells.

Directions to the Former Hulett Lagoon site: from the intersection of U.S. Highway 54 and State Route 5 in Camdenton, take State Route 5 northwest for 0.3 of a mile to East Mulberry; take a left onto East Mulberry and the first right onto West Mulberry. When the paved portion of West Mulberry curves to the left, continue straight onto a gravel driveway that leads behind the Ron Hulett Chevrolet-Olds-Buick Jeep/Eagle automobile dealership. Stay to the left on a gravel road that leads down to the lagoon. This road is not regularly maintained; there are several severe ruts caused from washouts.

The lagoon was named and most commonly referred to as the Hulett Lagoon, apparently due to its proximity to the Ron Hulett automobile dealership that is located at 249 N. Highway 5. The former Hulett Lagoon is currently an open field area with grassy vegetation. Remnants of the former berm and the road that surrounded the lagoon are still visible. The lagoon area is generally flat, with surface runoff flowing to the northwest and entering an intermittent drainage that travels to the west. There is a

monitoring well, installed by Modine Manufacturing's consultant, located just outside what would have been the southwest edge of the berm of the lagoon. This is known as MW-5. During the closure of the lagoon, apparently, no soil was brought in for the mixing. Some soil from the hillside southeast of the lagoon was scraped in to fill the void.

The lagoon is located in a mixed residential/commercial area of Camdenton. It is bordered on the north by an apartment complex; on the west by a strip of woods about 500 feet wide with Dawson Road on the other side; on the east by woods; and on the south by a strip of woods and then residences. At least two of the apartment buildings in the complex north of the site are within 200 feet of the site, as well as the apartment building and one home south of the site. Access to the lagoon area is not restricted. There is no fencing or gates.

Directions to the Camdenton Sludge Disposal Area site: from the intersection of U.S. Highway 54 and State Route 5 in Camdenton, take State Route 5 southeast for 4.4 miles to County Road 5-120; take a left onto CR 5-120, a gravel road, and travel east. The disposal area is 0.3 of a mile down the road on the north side.

The outline of the stockpiling area is faintly discernable today. The spreader used during the sludge disposal operation was left on-site and is situated approximately 100 yards northwest of the stockpiling area. There are no other structures in the area. Most drainage for the site flows into a low ditch that runs west to east across the southern portion of the site.

The sludge disposal area is bordered on the south by County Road 5-120; on the north by the Camdenton Memorial Airport; on the west by a residence; and on the east by a wooded area. The residence at 3499 RR3 is within 400 feet of the western edge of the site. Access to the site is not restricted. There is no fencing or gates

<u>December 16, 1998, Site Visits</u>
On December 16, 1998, Brian Allen, of the Environmental Services Program, and I traveled to Camdenton to visit the two sites and begin planning for the Combined PA/SI sampling events that were scheduled for January 1999. We met Mr. Larry Coleman, a city employee at the Sewer Treatment Plant, at the sludge disposal site near the airport. Mr. Coleman lives just down County Road 5-120 from the sludge disposal site.
Mr. Coleman told us about the sludge disposal operations that occurred during the closure of the Hulett Lagoon in 1989 and 1990. Since Mr. Coleman lived just down the road, he saw activity at the sludge disposal area almost daily. He said that the sludge was more difficult to spread evenly than the contractors originally anticipated. It didn't

dry out completely and would stick together in clumps. Near the end of the process, he said the contractor took the last several piles of sludge material and simply dumped them into the ditch located about 50 feet north of the circular storage area. It was not spread, mixed or disced.

The following information regarding the sampling events are details that are not documented in the Environmental Services Program Sampling Reports.

January 21, 1999, Sampling Event
Sampling at the Hulett Lagoon commenced on January 21, 1999. That day, Ron Hulett car dealership personnel reported that people often dump trash and junk in the wooded area behind their facility that borders the road leading down to the lagoon. There were also a few pieces of trash in the lagoon area.

January 22, 1999, Sampling Event
Sampling at the Camdenton Sludge Disposal Area site commenced on January 22, 1999. Green sludge material was encountered in borings Hulett 12 and Hulett 19, from the ditch area.

January 29, 1999, Sampling Event
Camden County PWSD #2 personnel reported that Well #2 is the primary well that supplies 99 percent of the water for the district.

VHW:ln

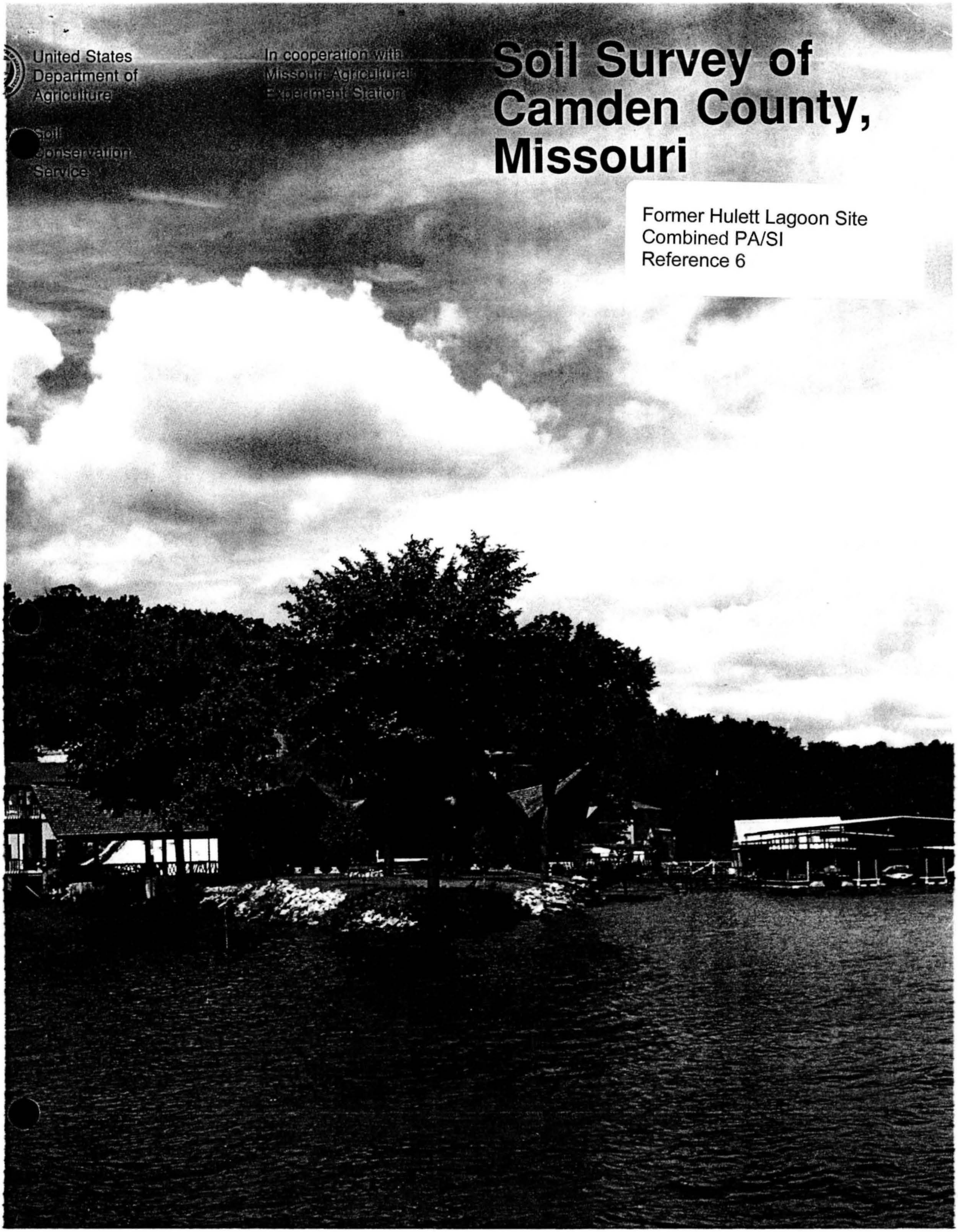
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Missouri Agricultural
Experiment Station

# Soil Survey of Camden County, Missouri

Former Hulett Lagoon Site
Combined PA/SI
Reference 6



# Contents



Issued March 1994

## General Nature of the County

This section provides general information about Camden County. It describes climate and history and development.

### Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Camdenton in the period 1951 to 1987. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 35 degrees F and the average daily minimum temperature is 24 degrees. The lowest temperature on record, which occurred at Camdenton on December 25, 1983, is -20 degrees. In summer, the average temperature is 77 degrees and the average daily maximum temperature is 89 degrees. The highest recorded temperature, which occurred on July 14, 1954, is 115 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 42.32 inches. Of this, 25 inches, or about 59 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 4.67 inches at Camdenton on October 13, 1968. Thunderstorms occur on about 53 days each year.

The average seasonal snowfall is about 19 inches. The greatest snow depth at any one time during the period of record was 16 inches. On the average, 12 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south-southwest. Average windspeed is highest, 12 miles per hour, in spring.

Tornadoes and severe thunderstorms occur occasionally, but they are local in extent and of short duration. They may cause damage in scattered areas. The amount of damage varies. Hailstorms sometimes occur in scattered small areas during the warmer part of the year.

### History and Development

Osage and Delaware Indians once inhabited the territory now known as Camden County. They built their villages on the terraces along major streams, where they hunted, fished, and raised corn, beans, and pumpkins. In 1827, white settlers began moving into the area after the Indians signed a treaty ceding the land to the U.S. Government *(3)*. For many years after the treaty was signed, the Indians continued to hunt in the area. They camped at various places and hunted deer, bears, turkeys, and raccoons and other small game. They preserved the meat by drying it on scaffolds over fires. After 1846, they no longer returned to the area as a group *(3)*.

Ruben Berry and William Pogue were among the earliest permanent white settlers in the survey area. When they arrived in 1827, they discovered the hull of a keelboat submerged in the Osage River *(3)*. Also, a wooden fur press was found at the mouth of Linn Creek. These artifacts were evidence that French or Spanish explorers, hunters, and trappers had also been in the area. Other settlers later came to the area from Kentucky, Tennessee, and Virginia *(8)*.

Kinderhook County, which is now known as Camden County, was organized in accordance with an act of the Legislature and approved by Governor Thomas Reynolds on January 20, 1841 *(3)*. A site was selected for the county seat on April 12, 1841, in the town of Oregon. The county name was changed to Camden County by an act of the General Assembly of Missouri on February 23, 1843, and the name of the county seat was changed from Oregon to Erie. In 1850, the county seat was moved from Erie to Linn Creek *(3)*. When Linn Creek was inundated by the creation of the Lake of the Ozarks, the county seat was moved to its present location at Camdenton.

Because of the cherty soils, limited transportation facilities, distant markets, and hilly, forested topography, the agricultural enterprises of the area were generally limited to part-time livestock farming. Timber was harvested mostly for railroad ties, fuel, and building material. Other occupations centered around hunting and fishing and the handcrafting of necessities for subsistence. Some row crops were grown in small areas on the stream terraces and flood plains and were used as livestock feed. After World War II, the livestock economy was based on the production of unfinished feeder cattle *(5)*. Higher cattle prices in the 1960's and 1970's made the conversion of timberland to pasture profitable.

Former Hulett Lagoon Site
Combined PA/SI
Reference 7

S ENT OF COMMERCE





Property of

Please return to →



# TECHNICAL PAPER NO. 40

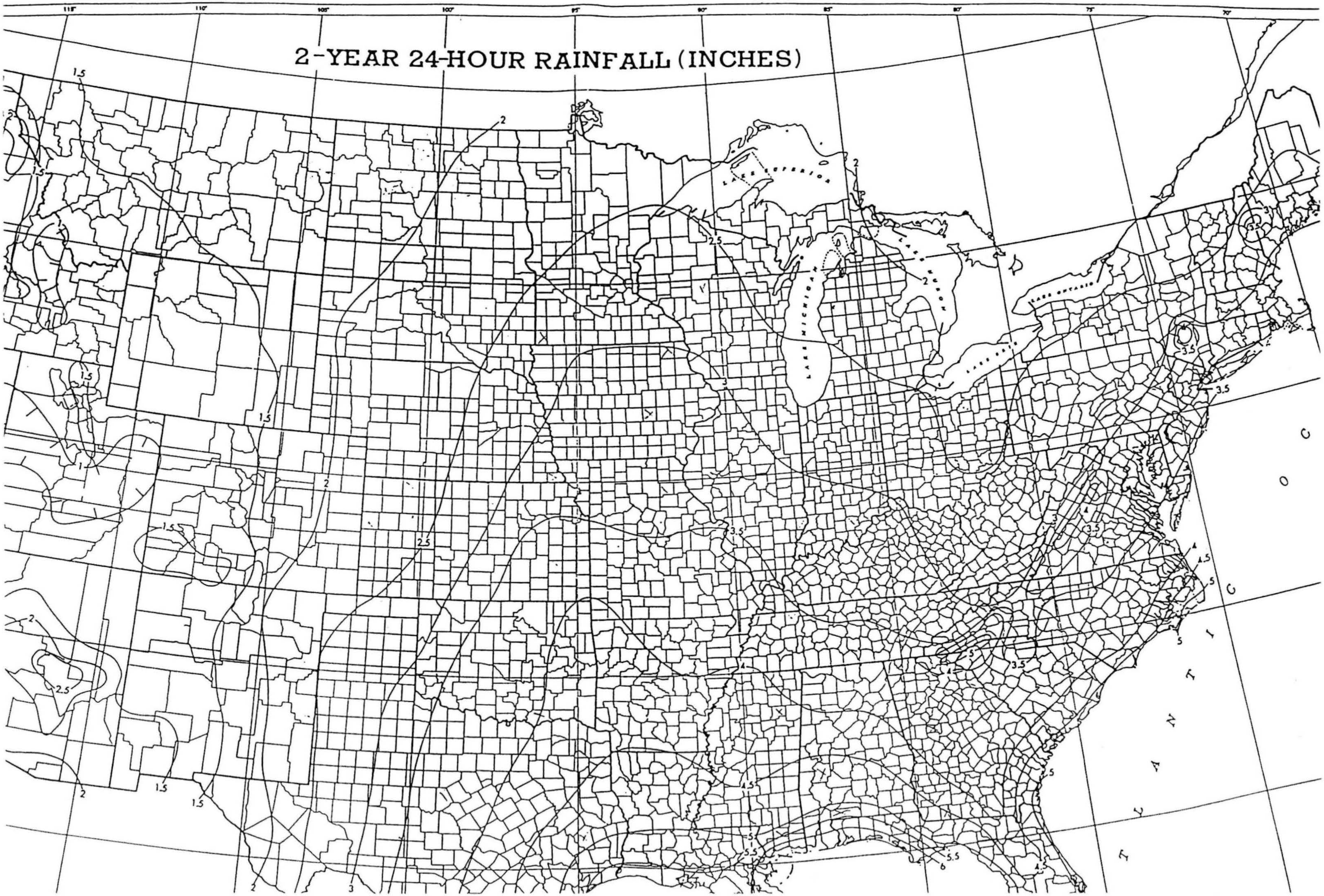
# RAINFALL FREQUENCY ATLAS OF THE UNITED STAT

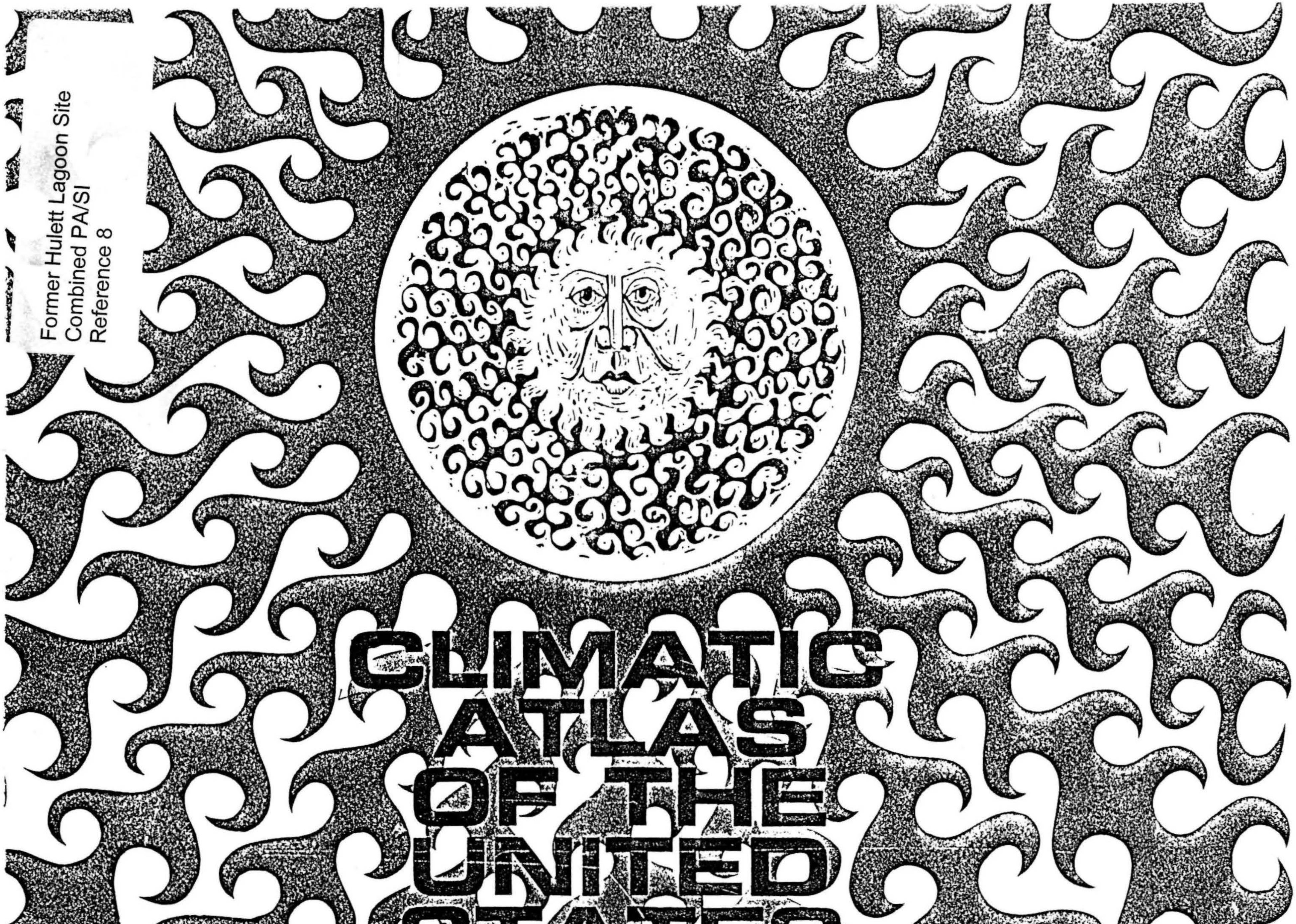
## for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

National Weather Service Office
for State Climatology
P. O. Box 941
Columbia, Missouri 65201

1961

# 2-YEAR 24-HOUR RAINFALL (INCHES)





# CLIMATIC ATLAS OF THE UNITED STATES

U.S. DEPARTMENT OF COMMERCE
C. R. Smith, Secretary

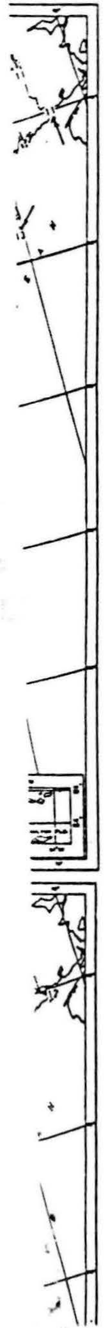
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
Robert M. White, Administrator

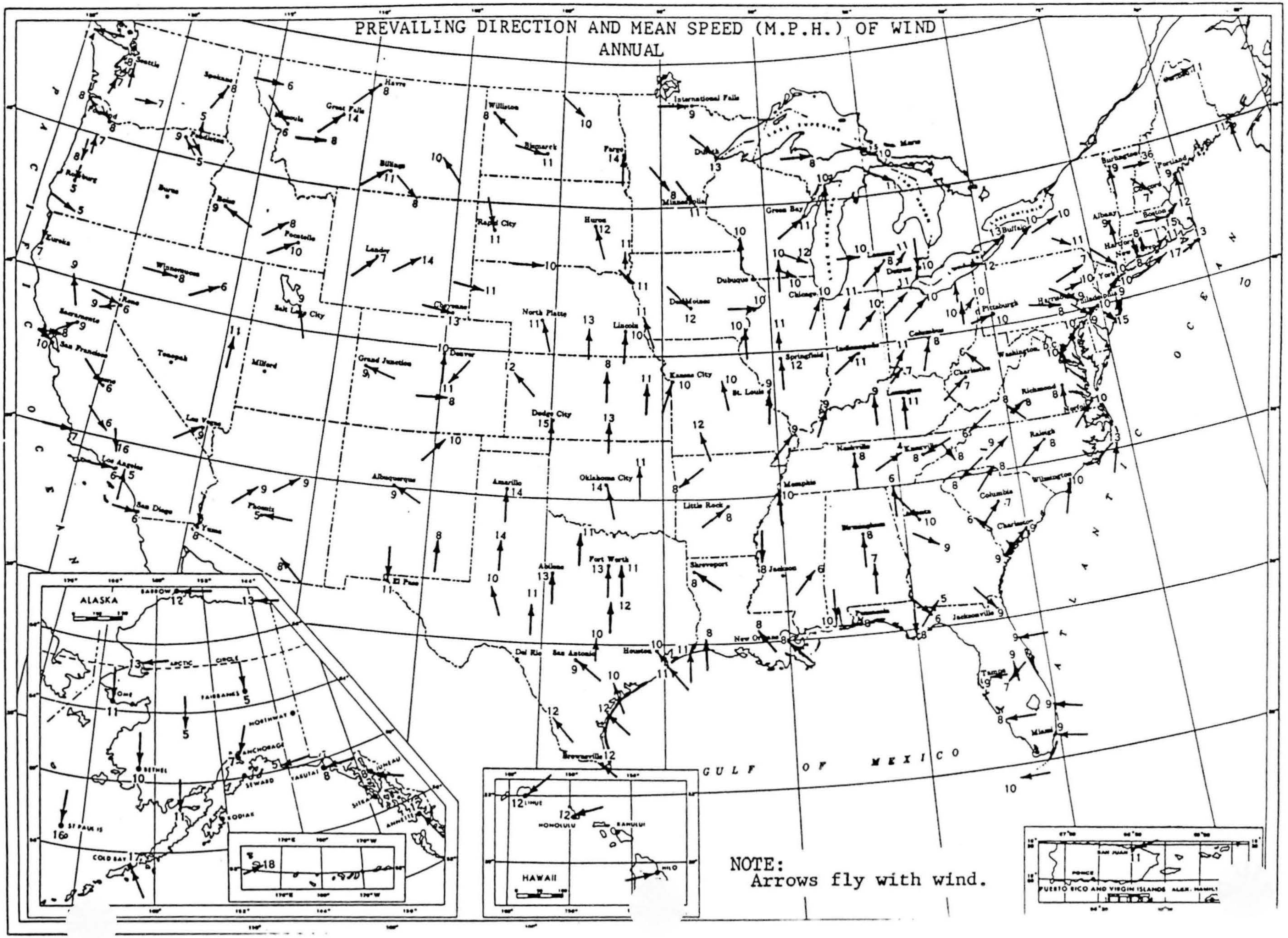
ENVIRONMENTAL DATA SERVICE
Woodrow C. Jacobs, Director

JUNE 1968

REPRINTED BY THE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
1983

# MEAN SPEED (m.p.h.), AND FASTEST MILE OF WIND, MONTHLY AND ANNUAL - Contin






FA

ST.

OHIO

OKLA

OREG

PA.

R. I.

S. C.

S. DA

TENN.

TEXAS

Former Hulett Lagoon Site
Combined PA/SI
Reference 9

**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**ALTERNATIVE REMEDIAL CONTRACTING STRATEGY**

**REGIONS VI, VII, VIII**

**VOLUME I**

**FINAL**
**ENVIRONMENTAL PRIORITIES INITIATIVE/**
**PRELIMINARY ASSESSMENT**
**MODINE HEAT TRANSFER, INC.**
**(FORMERLY SUNDSTRAND TUBULAR PRODUCTS)**
**BOX 636 SUNSET DRIVE**
**CAMDENTON, CAMDEN COUNTY, MISSOURI**
**EPA ID NO. MOD062439351**

**U.S. EPA CONTRACT NO. 68-W8-0122**
**U.S. EPA WORK ASSIGNMENT NO. 47-7JZZ**
**U.S. EPA REGION VII**

**PREPARED BY**

**JACOBS ENGINEERING GROUP, INC.**
**10901 WEST 84TH TERRACE, SUITE 210**
**LENEXA, KANSAS 66214**
**(913) 492-9218**
**JACOBS PROJECT NUMBER 12-D247-22**



**SEPTEMBER 1992**

TABLE OF CONTENTS



FIGURES

## TABLES



## APPENDICES

## EXECUTIVE SUMMARY

A Visual Site Inspection (VSI) and a Preliminary Assessment (PA) were conducted by Jacobs Engineering Group Inc. (Jacobs), on behalf of the U.S. Environmental Protection Agency (EPA) Region VII, at Modine Heat Transfer, Inc. (MHT) on March 4, 1992. The Modine facility is on Sunset Drive in Camdenton, Missouri, in Camden County. MHT is a manufacturing facility that produces air conditioning coils and feeder parts from aluminum and copper tubing. The manufacturing process consists of aluminum and copper cutting and brazing, aluminum etching, and, previously, a limited amount of chromium electroplating.

The facility began production in 1967. During the history of the facility, the ownership has changed three times. Previous owners include Dawson Metal Products, Inc. (1967 to 1974) and Sundstrand Tubular Products (1974 to 1990). MHT is the current owner/operator. Various types of hazardous waste are generated during the manufacturing process including: 1,1,1-trichloroethane (TCA); paint waste; wastewater pretreatment sludge; solvents; and waste oil. Non-hazardous wastes generated by the facility include: paper; cardboard; scrap metal; and general refuse. All wastes are either drummed in 55-gallon barrels, stored in high-capacity storage tanks, shipped to recycling centers, processed by the pretreatment wastewater unit, and released to the city publically-owned treatment works (POTW), or stored for reclamation or disposal by contracted services. From 1967 until 1986, wastes were disposed through mudpits to the Hulett Lagoon, which was owned by the city of Camdenton. In 1986, a pretreatment wastewater system was placed on-line, which remains in service.

Thirty-four Solid Waste Management Units (SWMUs) and four Areas of Concern (AOCs) have been identified at this facility. The SWMUs and AOCs identified are:

| | |
|---|---|
| SWMU Number 1 | Hulett Lagoon |
| SWMU Number 2 | Mudpits |
| SWMU Number 3 | Pretreatment Wastewater System/Filter Press |
| SWMU Number 4 | Tank and Drum Storage Area Number 1 |
| SWMU Number 5 | Drum Storage Area Number 2 |
| SWMU Number 6 | Waste FIN Oil Storage Tank Number 1 |
| SWMU Number 7 | TCA Waste Storage Tank Number 6 |
| SWMU Number 8 | Copper Cleaning Line |
| SWMU Number 9 | Copper Cleaning Line Scrubber |
| SWMU Number 10 | Aluminum Cleaning Line |
| SWMU Number 11 | Large Aluminum Brazing Furnace |
| SWMU Number 12 | Large Aluminum Brazing Furnace Scrubber |
| SWMU Number 13 | Small Aluminum Brazing Furnace |
| SWMU Number 14 | Small Aluminum Brazing Furnace Scrubber |

| | |
|---|---|
| SWMU Number 15 | Chrome Cleaning Line |
| SWMU Number 16 | Chrome Cleaning Line Scrubber |
| SWMU Number 17 | Aqueous Cleaning Bath |
| SWMU Number 18 | Vapor Degreaser and Still M184 |
| SWMU Number 19 | Vapor Degreaser and Still M185 (Former) |
| SWMU Number 20 | Vapor Degreaser and Still M185 (New-Location 1) |
| SWMU Number 21 | Vapor Degreaser and Still M185 (New-Location 2) |
| SWMU Number 22 | Vapor Degreaser and Still M487 (Former) |
| SWMU Number 23 | Vapor Degreaser and Still M487 (New) |
| SWMU Number 24 | Vapor Degreaser and Still M460 (Former-Location 1) |
| SWMU Number 25 | Vapor Degreaser and Still M460 (Former-Location 2) |
| SWMU Number 26 | Vapor Degreaser and Still M567 |
| SWMU Number 27 | Vapor Degreaser and Still M394 (Former-Location 1) |
| SWMU Number 28 | Vapor Degreaser and Still M394 (Former-Location 2) |
| SWMU Number 29 | Vapor Degreaser and Still M394 (Former-Location 3) |
| SWMU Number 30 | Two 2,000-Gallon Storage Tanks |
| SWMU Number 31 | Drum Storage Area Number 3 |
| SWMU Number 32 | Pretreatment/Drum Storage Area |
| SWMU Number 33 | Non-Hazardous Waste Receptacle |
| SWMU Number 34 | Scrap Metal Storage Bins |
| SWMU Number 35 | Fire Training Area |
| AOC A | Raw Materials Storage Area |
| AOC B | Pallet Storage Area |
| AOC C | Tool Crib/Maintenance Area |
| AOC D | Paintline |

The above-listed SWMUs remain active with the exception of SWMU Numbers 1, 2, 4, 5, 11, 12, 13, 15, 16, 19, 20, 22, 24, 25, 27, 28, 29, and 31. These SWMUs are no longer in operation and, except for a portion of SWMU Number 2, have been dismantled or removed from the site.

Two potential release areas were identified in 1991 by LAW Environmental during an Environmental Site Assessment conducted on behalf of the MHT facility. The areas investigated include two former drum storage areas (SWMU Numbers 4 and 31) where soil borings revealed elevated levels of hazardous substances. LAW recommended further investigation to determine the nature and extent of the contamination.

The facility holds interim status as a treatment, storage, and disposal (TSD) facility. In March 1992, MHT submitted a Revised Closure Plan to the Missouri Department of Natural Resources (MDNR) in order to terminate its interim status.

The gray bat (myotis griesecens) is the only federal and state-threatened species known to exist within a 15-mile downstream distance from the facility. No critical habitats or sensitive environments exist at the facility or are within one-half mile. No aquatic critical habitats or sensitive environments exist within 15-miles downstream from the facility.

**SWMU NUMBER:** 1

**SWMU NAME:** Hulett Lagoon

**SWMU DESCRIPTION:** The Hulett Lagoon is 1/4 mile northeast of the Modine facility on the east side of Dawson Road. The lagoon is owned by the City of Camdenton, Missouri. The lagoon was constructed in 1961 under the State of Missouri Grants Program and is approximately one acre in size. The lagoon was constructed of clay, and its berms were approximately 25 feet wide and 15 feet high. The location of the Hulett Lagoon is depicted on Figure 1 as SWMU Number 1 (Reference 15).

Modine began utilizing the lagoon in 1967. The facility would release its untreated wastewater and stormwater into the lagoon through a series of "mudpits" (SWMU Number 2) via a storm sewer.

**DATES OF OPERATION:** The Hulett lagoon was in operation from 1961 until its closure in late 1989. The Modine facility utilized the lagoon for its waste disposal system from 1967 through 1986, when the facility installed its pretreatment wastewater system.

In 1988, the City of Camdenton began RCRA closure of the Hulett Lagoon. The sludge was sampled for metals, and analytical results are presented in Appendix H. High levels of chromium, lead, and nickel were detected. City officials were given several options by MDNR to consider in completing the abandonment and closure of the Lagoon within the MDNR Water Resources Program (Appendix I). The option chosen and implemented by the city was the subsurface application of sludge from the lagoon by spreading it in place and discing and plowing it into the subsurface soils. The berms were then turned in and mixed to a 1:1 ratio with surrounding soils. The sludge was then taken by truck to the municipal airport and land-applied at a field near the runway in accordance with the terms of the MDNR correspondence contained in Appendix I. No confirmation samples were collected following removal of the sludge. The city is in the process of leveling the site of the former lagoon and opening it up for a neighborhood park (Reference 15). It should be mentioned that using this area for purposes other than sewage sludge disposal is contrary to the terms agreed upon between MDNR and the City of Camdenton.

**WASTES MANAGED:** Wastes managed by the Hulett Lagoon included all wastewater, stormwater, and aluminum and copper cleaning line wastes from the MHT facility. Information regarding the type and quantity of waste distributed and accumulated at the Hulett Lagoon is not available. Potential wastes handled include: F001, F006, D001, and D098.

**RELEASE CONTROLS:** Release controls at the Hulett Lagoon include clay lining and berms.

**RELEASE HISTORY:** The Hulett Lagoon was the site for release of all untreated process wastes from the MHT facility. As stated previously, elevated levels of chromium, lead, and nickel were detected in the sludge analysis recorded during closure of the lagoon.

**MIGRATION PATHWAYS:** The primary migration pathways for contaminants in order of decreasing likelihood would be soil, surface water, and groundwater.

**PHOTOGRAPH NO.:** 1 and 2

**SWMU NUMBER:** 2

**SWMU NAME:** Mudpits

**SWMU DESCRIPTION:** Four "mudpits" (sumps) were located approximately 10 feet west of the manufacturing building. The mudpits were approximately 15 feet apart, running from the scrap-metal bins to the pretreatment/drum storage area (SWMU Number 32). Each mudpit consisted of a 4-foot by 4-foot cement sump approximately 4 feet in depth. Two of the four mudpits no longer exist and are beneath the pretreatment/drum storage area. The location of the mudpits is depicted on Figure 3 as SWMU Number 2.

The mudpits were connected by a 6-inch steel line that delivered stormwater, boiler water, chrome, copper, and aluminum cleaning line waste from the manufacturing process. Each sump received the previous sump's wastes until wastewater was discharged into the sewer. The southern-most mudpit was an open pit which collected boiler water and stormwater. The second mudpit directly collected aluminum cleaning line waste and stormwater from the first. The third and fourth mudpits collected copper cleaning line waste in addition to the aluminum cleaning line waste and the stormwater runoff. These four mudpits collectively discharged wastewater into a storm sewer line which led directly to the Hulett Lagoon (SWMU Number 1)(Reference 12).

**DATES OF OPERATION:** The mudpits were in operation from 1967 to 1986. Two of the four mudpits were removed to construct the pretreatment/drum storage area. The two remaining mudpits, which are no longer in service, are covered by plywood sheets.

**WASTES MANAGED:** Wastes managed by the mudpits included wastewater, stormwater, and aluminum and copper cleaning line wastes. Information on the type and quantity of waste accumulated and distributed through the mudpits is unavailable. Potential wastes handled by these units include: F001, F006, D001, and D098.

**RELEASE CONTROLS:** Release controls for the mudpits included the 4-foot by 4-foot concrete sump walls which were 6 inches in width. The sumps were covered on the surface by a wooden ply-board which prevented precipitation from entering the sumps. The southern-most sump was not covered, however, and did receive run-on from the manufacturing building. No other release controls or secondary containment were utilized at this SWMU.

**RELEASE HISTORY:** There is no record or documentation of any release of materials associated with the mudpits during the operation lifetime.

**MIGRATION PATHWAYS:** If a release were to occur from the mudpits, the primary migration pathways would be soil, surface water, groundwater, and air, in decreasing order of likelihood.

**PHOTOGRAPH NO.:** 3

# /IISSOURI WATER QUALITY
# 3ASIN PLANS

# /OLUME 4

Osage and Gasconade Rivers (Including ake of the Ozarks, Truman Reservoir, South irand, Little Osage, Marmaton, Marais des ygnes, Sac and Pomme de Terre Rivers, ebo Creek and Big Piney River).

## 'ABLE OF CONTENTS

Page



## INTRODUCTION

Missouri's Water Quality Basin Plans are a guide to managing the quality of the aquatic resources of the state In their simplest form they are a set of water quality problems and a corresponding set of actions which will correct these problems

There are only a few basic kinds of water quality problems such as organic enrichment from domestic and industrial discharges and from livestock, discharges of toxic materials which come from domestic and industrial sources, acid runoff or seepage from coal mined lands, highly mineralized water (a naturally occurring problem in certain groundwaters), and lastly, sediment from erosion of soil or mine tailings

At any given location, the apparent simplicity of our water problems is complicated by such specifics as the volume of the pollutant discharge and its variability, the concentration of specific pollutants and their variability, and the volume of the receiving stream and its variability The proximity of other pollutant sources or areas of water use (water based recreation areas, drinking water withdrawal points) tends to make a problem in a particular location, if not unique, at least discernably more or less severe than a similar problem in another location These plans should note which problems are of the highest priority

In recognizing the need to write management plans for specific problem areas, this document divides the state into eight major drainages (corresponding to the eight volumes of this document). It then divides the eight drainages into 77 basins and presents a specific list of water quality problem areas and recommended solutions for each basin

The first part of each basin plan is a description of the basin in terms of geography, geology, hydrology, and aquatic use potential This description is followed by a detailed inventory of all known actual or potential sources of water pollutants The final part of the basin plan is a discussion of water quality problems and how they affect our water quality goals for the basin. and the basin plan itself in the form of tables listing specific water quality problems, their sources, and recommended solutions

Each basin plan consists of the following sections

**BASIN NUMBER**

**BASIN NAME**

**DRAINAGE AREA**

**COUNTIES:** (Included partially or wholly within the basin)

**BASIN DESCRIPTION:** Geographic limits of the basin and major streams within the basin

**LAND USE:** Percentage of basin in forest. pasture or cropland urban lands, or mined lands

**CLASSIFIED STREAMS:** Missouri's water quality standards (CSR 1981) recognize three kinds of surface waters

P1 Reservoirs, Lakes, Sloughs, Backwaters, and other impounded waters

P Permanently flowing streams

C Streams which may cease flow during prolonged dry weather but maintain permanent pools which act as refuges for aquatic life and provide drinking water for livestock and wildlife

**HYDROGEOLOGY:** A description of the surficial and underlying geologic strata and how they influence water movement within the basin

**GEOLOGIC CROSS SECTION DIAGRAM:** This diagram shows the geologic strata from the surface to a depth of at least 500 feet, indicates how deeply stream valleys incise these strata, and indicates how much water is discharged by known springs from each of these strata

**STREAM FLOW:** Stream flow data are taken from USGS records There are several flow statistics or descriptions used in water management Those included in the stream flow table which may require explanation are

Mean flow The arithmetic average flow That is, the sum of all flows divided by the number of flow measurements.

Median flow The flow which is exceeded exactly 50% of the time.

7 day-Q10 flow The lowest average flow for a seven consecutive day period with a recurrence interval of ten years.

7 day-Q2 flow. The lowest average flow for a seven consecutive day period with a recurrence interval of two years

**STREAM USES (CSR, 1981):** Missouri recognizes nine beneficial uses of the state's waters. Based on numerous public meetings, user surveys and other studies, each classified stream in the state (Class P1 P. or C), or segment thereof, has a list of uses appropriate to that stream The Mississippi and Missouri Rivers and Shoal Creek (Jasper and Newton Counties) have the most recognized uses (seven), a few streams which are badly polluted, like Turkey Creek (Jasper County), have none.

The nine beneficial uses are: (1) Irrigation of croplands. (2) Livestock and wildlife watering, (3) Protection of aquatic life and fishing, (4) Coldwater sport fishery (trout fishing), (5) Whole body contact recreation (swimming, water skiing, skin diving), (6) Drinking water supply, (7) Industrial process and cooling water; (8) Commercial fishing, (9) Limited water contact recreation (canoeing, boating)

**LAKE USES (CSR, 1981):** All classified lakes and reservoirs (P1) are identified and their beneficial uses listed A list of all lakes and reservoirs (including unclassified ones) greater than 50 acres is given, showing location, size, and major use(s)

This section also gives the total number of lakes and reservoirs inventoried by the dam safety program (generally those reservoirs greater than 2 acres in area), the range in size, and the mean and median lake area

**WITHDRAWALS:** This section indicates whether or not there are public drinking water withdrawals from surface waters in this basin and which streams or reservoirs these withdrawals are taken from

**POPULATION:** 1980 population data are given as is the population change from 1970 to 1980 This section also makes projections of future population trends

**WATER QUALITY DATA:** Important sources of water quality information for the basin are listed Other information referenced within the basin plans but not listed here appear in a bibliography at the end of each of the eight volumes

**ENDANGERED SPECIES:** Any animal species which should be noted by an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) are included Either an EIS or a FONSI is required for any construction activity that uses federal funds

**BASIN MAPS:** There are two basin maps The first shows the classified stream network, those unclassified streams having an NPDES or Non-NPDES facility, and the unclassified headwaters of classified streams It also shows stream names, county lines, the location and sizes of all NPDES discharges and other potentially significant sources of water pollution. Solid stream lines are classified "P", dashed stream lines are classified "C", and dot-dashed stream lines are unclassified The letter-number code is explained in Table 1

The second map shows the drainage network and the location of towns, petroleum and ammonia pipelines, and active railroads. It also shows losing stream segments as heavy dotted lines (Where there is contradictory information on stream names, the names appearing on USGS 7 5- or 15-minute topographic maps are used )

**OTHER MAPS:** A few basins have additional maps which give more detailed information on location, size, and condition of lead-zinc and barite tailings areas.

**LOW FLOW DIAGRAM:** This diagram is a schematic map of the basin which shows all classified streams and all potentially significant discharges

All streams are shown as vertical lines and are drawn to scale for actual stream length Solid lines are Class P streams, dashed lines are Class C streams, and alternating dots and dashes are unclassified streams The width of the vertical lines of Class P streams are drawn to scale for volume of flow at the 7 day-Q10

Horizontal lines are not stream segments, but they mark the location of inflow of discharges or tributaries to a stream Volume of tributary inflows or discharges are also estimated flows for the 7 day-Q10, and these numbers follow the name of the tributary or the discharge on the horizontal line Numbers appearing on the vertical stream lines are calculated 7 day-Q10 values

Stream segments known or believed to be affected by discharges are indicated

Lakes and reservoirs are drawn to their approximate shape The length of the impoundment can be found by scaling the distance along the center line of the impoundment The outlines of reservoirs have two lines The inner line indicates the boundaries of the normal use pool and the outer line the flood pool.

**INVENTORY TABLE:** This table lists all NPDES permitted discharges in the basin, other potential waste or wastewater sources, and surface withdrawals for public drinking water supplies "S" "T" "R" refers to "Section", "Township", and "Range" If there is no direction after the range, it is assumed to be "West".

**WATER QUALITY PROBLEMS, POINT SOURCE:** Point source problems have been identified through physical and chemical water quality monitoring by the Department of Natural Resources and several other organizations, and by visual surveys and surveys of the benthic plant and animal communities of streams These latter surveys are conducted primarily by the Departments of Conservation and Natural Resources

**WATER QUALITY PROBLEMS, NON-POINT SOURCE:** Non-point source water quality problems have been quantified, where possible, by Section 208 planning activities which took place between 1978 and 1982 Soil erosion and sediment delivery studies were made by SCS and USGS Lead-zinc mining related impacts were studied by USGS, the Departments of Conservation and Natural Resources, and the University of Missouri, Rolla Inventories of lead-zinc, coal, and barite mining areas and their reclamation states were made by the Department of Natural Resources

**BENEFICIAL USE ATTAINMENT:** This section evaluates existing in-stream water quality and whether or not it meets the standards required for the beneficial uses identified in that basin

**SUMMARY TABLE OF POINT SOURCE PROBLEMS AND MANAGEMENT NEEDS:** All municipal facilities are listed as are any non-municipal NPDES permitted discharges that are, or are suspected of causing water quality problems in receiving streams. Length of affected segment, classification of affected segment (permanent flow (P), permanent pools and intermittant flow (C), and completely dry stream bed during dry periods (U) ), a recent permit compliance record and recommended DNR action to alleviate the problem are all included in this table The severity of impacts were described as affected (aff) or polluted (poll) A polluted length had a partially or totally impaired use An affected length had a noticeable affect but uses were not impaired

**SUMMARY TABLE OF OTHER PROBLEMS AND MANAGEMENT NEEDS:** This table lists all known or suspected water quality problems arising from sources that do not hold NPDES permits Soil erosion, stream channelization, drainage from abandoned mined lands or animal confinement areas are common non-NPDES source problems The problem, the stream segment affected, cause, and the recommended DNR action to alleviate the problem are included in the table

Volume 4 contains Basins 30-46 which include all streams in the Osage and Gasconade River System

The streams of the western part of the Osage River basin rise in Kansas or extreme western Missouri and flow through a flat prairie land of row crops and pastures Although most of the area has not been glaciated, it is underlain by Pennsylvanian rock which retards downward movement of water to the groundwater Thus most rainfall runs off the surface of the land rather than soaking in. There are short periods of high stream flow during and immediately after rains, and streams have low or no flow during dry periods Groundwaters are recharged very slowly, groundwater movement is slow, and wells generally yield small amounts of water which are usually very mineralized

The streams further east are in unglaciated terrain underlain by older limestones and dolomites There is more movement of water to the subsurface, thus baseflows of streams are greater and wells usually have good yields of potable water

The Osage system contains four large reservoirs which are a major focal point for fishing, camping, boating, and swimming in the state The Gasconade River is totally unimpounded and is an excellent river for canoeing and float fishing for smallmouth bass. The four large reservoirs have reduced stream habitat in the basin but have replaced it with lake habitat Thus the potential fishery has been increased but the presence and operation of the reservoirs, particularly Truman Reservoir, threatens to reduce this fishery

Except in western Missouri where soil erosion causes instream turbidity and some loss of aquatic habitat, nonpoint pollution sources are not significant factors in aquatic habitat degradation

# TABLE 31-1—LAKE OF THE OZARKS

**NPDES Inventory**

| FACILITY | Location S T R | Receiving Stream | County | Facility Type or Waste Char. | Design P.E. | Flow (MGD) | NPDES Permit No. |
|---|---|---|---|---|---|---|---|
| **Municipal Discharges** | | | | | | | |
| W1 Camdenton Lgn #1 CP White | NW SE 35,38,17 | Racetrack Hollow | Camden | 2-c lagoon | 1,765 | 176 | 0048569 |
| W2 Camdenton Lgn #2 Cedar Str | NW SE 25,38,17 | Trib to Lake of the Ozarks | Camden | 2-c lagoon | 742 | 074 | 0048585 |
| W3 Camdenton Lgn #3 Factory Rd | SW SW 24,38,17 | Trib to Jarvis Hollow | Camden | 1-c lagoon | 265 | 027 | 0048577 |
| W4 Camdenton Lgn #5 Clint Ave/Wilkerson Ave | Ctr E W 24,38,17 | Possum Hollow Ck | Camden | 2-c lagoon | 716 | 071 | 0048607 |
| W5 Camdenton Lgn. #6 Parish Subd | Ctr. N S 19,38,16 | Trib. to S Fk Linn Ck | Camden | 1-c lagoon | 850 | 085 | 0048593 |
| W6 Cole Camp STP | NE SE 34,43,21 | Cole Camp Creek | Benton | Oxidation Ditch | 2,225 | 222 | 0056626 |
| W7 Lincoln Lgn (E) | NE NW 26,42,22 | Trib to Cole Camp Creek | Benton | 1-c lagoon | 870 | 087 | 0044199 |
| W8 Linn Creek STP | SE SW 8,38,16 | Linn Creek | Camden | 1-c lagoon | 45 | 004 | 0054712 |
| W9 Warsaw STP | NE SE 16,40,22 | Lake of the Ozarks | Benton | 3-c lagoon | 2,200 | 220 | 0049239 |
| **Non-Municipal Discharges** | | | | | | | |
| W17 Skyline Motel | NW 6,39,15 | Lake of the Ozarks | Camden | 1-c lagoon | 35 | 001 | 0083470 |
| W18 Shoreline Motel | SW 19,40,15 | Lake of the Ozarks | Miller | Septic tank/s f | 35 | 001 | 0083488 |
| W19 Alhonna Resort | SE NE 25,40,17 | Lake of the Ozarks | Camden | septic tank/s.f | 35 | 002 | 0083399 |
| W20 Gold Nugget Junction | NE 28,39,16 | Trib to Lake Ozarks | Camden | 1-c lagoon | 32 | 002 | 0083313 |
| W21 Camdenton Med Center | SW 14,38,17 | Possum Hollow | Camden | 1-c lagoon (Hg, Ba, Ag limits) | 73 | 005 | 0083305 |
| W22 | | | | | | | |
| W23 Point Breeze Resort | NE 11,39,16 | Lake of the Ozarks | Camden | septic tank/s f | 57 | 003 | 0083267 |
| W24 Osage Beach Elem School | S 6,39,15 | Trib to Lake of the Ozarks | Camden | septic tank/s f | 165 | 002 | 0082988 |
| W25 | | | | | | | |
| W26 Lodge of the Four Seasons | SW SW 27,40,16 | Lake of the Ozarks | Camden | activ sludge | 3,268 | 376 | 0082171 |
| W27 Tan-Tar-A Resort | SE SE 7,39,16 | Lake of the Ozarks | Camden | Rotating Bio-Media | 1,700 | 170 | 0081937 |
| W28 Tan-Tar-A Estates | SW SE 7,39,16 | Lake of the Ozarks | Camden | extended aeration | 500 | 050 | 0081965 |
| W29 Lake Osage Apartments | SW SW 1,39,16 | Lake of the Ozarks | Camden | extended aeration | 90 | 009 | 0081931 |
| W30 Camp Sabra | NE SW 7,40,16 | Lake of the Ozarks | Morgan | 1-cell lagoon | 50 | 005 | 0056324 |
| | | | | septic tank/s f | 30 | 003 | |
| W31 Waters Edge Condo | NW NW 34,40,16 | Lake of the Ozarks | Camden | extended aeration | 1,272 | 084 | 0054348 |
| W32 Fawn Valley Commun | NE NE 5,39,18 | Lake of the Ozarks | Camden | extended aeration | 500 | 050 | 0054071 |
| W33 Kirkwood Lodge | S 6,39,15 | Trib to Lake of the Ozarks | Camden | septic tank/s f | 60 | 006 | 0044768 |
| W34 Hawk Nest Lodge | NW SE 11,39,16 | Lake of the Ozarks | Camden | extended aeration | 436 | 044 | 0101168 |
| W35 Headwaters Motel | SW 22,40,22 | Trib to Lake of the Ozarks | Benton | 1-c lagoon | 36 | 003 | 0043982 |
| W36 Harbor Houses Condo | SE NE 33,41,17 | Soap Ck | Morgan | 1-c lagoon | 74 | 007 | 0034151 |
| W37 Mariner's Cove Subd | SW 11,39,16 | Lake of the Ozarks | Camden | extended aeration | 321 | 032 | 0034004 |
| W38 Ft Leonard Wood Rec Area (S) | NW NW 32,39,15 | Lake of the Ozarks | Camden | 2-c lagoon | 50 | 002 | 0029777 |
| W39 Ft Leonard Wood Rec Area (N) | NE NE 30,39,15 | Lake of the Ozarks | Camden | 3-c lagoon | 161 | 011 | 0029769 |
| W40 Windjammer Condo | NE NE 21,40,16 | Lake of the Ozarks | Camden | extended aeration | 130 | 013 | 0100471 |
| W41 Town and Country Motel | SE SE 10,39,16 | Trib to Lake of the Ozarks | Camden | extended aeration | 113 | 004 | 0100889 |
| W42 Osage Beach Skelly | SW SE 16,39,16 | Lake of the Ozarks | Camden | extended aeration | 13 | 002 | 0101443 |
| W43 Fifty-eight Facets Spa Resort | SW SE 19,40,16 | Lake of the Ozarks | Camden | extended aeration | 183 | 019 | 0099988 |
| W44 Eagle Point Condo | 28,40,16 | Lake of the Ozarks | Camden | extended aeration | 30 | 003 | 0099805 |

## TABLE 31-2—SUMMARY OF POINT SOURCE IMPACTS AND MANAGEMENT NEEDS

| Waste Trt. Mgnt. Area | Type Sewerage Facility | Receiving Water Impacts | | | | | Freq. Non-Compliance | Management Needs/ Priority | Expected Beneficial Use Improvement | Future DNR Monitoring Needs | Recommended Action |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Estimated | | Observed | | | | | | | |
| | | Impact | Miles | Impact | Miles | Severity | | | | | |
| Camdenton | 2-c lagoon #1 (C P White) | | | No impact 82 | | | | Eliminate, regional facility/Low | Public health benefit | Low-flow survey after upgrade | Refer to Grants Admin Sect. |
| | 2-c lagoon #2 (Cedar St ) | | | No impact 82 | | | | Eliminate, regional facility/Low | Public health benefit | Low-flow survey after upgrade | Refer to Grants Admin. Sect. |
| | 1-c lagoon #3 (Factory Rd.) | | | No impact 82 | | | | Eliminate, regional facility | | Effluent analyses for toxic metals and organics | Refer to Grants Admin. Sect. |
| | 1-c lagoon #4 (Wilkerson Ave ) | | | No impact 82 | | | | Eliminate regional facility/Low | Public health benefit | Low-flow survery after upgrade | Refer to Grants Admin Sect |
| | 1-c lagoon #5 (Clint Ave.) | | | No impact 82 | | | | Eliminate, regional facility/Low | Public health benefit | Low-flow survey after upgrade | Refer to Grants Admin. Sect. |
| | 1-c lagoon #6 (Parish Subd.) | | | No impact 82 | | | | Eliminate, regional facility/Low | Public health benefit | Low-flow survey after upgrade | Refer to Grants Admin. Sect. |
| Cole Camp | Oxidation ditch | | | Reduced benthos, discoloration 83 | 2.0 C | Aff | | Proper O&M/Low | Minor aesthetic improvement, improved aq habitat | Low-flow survey 84 | Continued observation by R.O. |
| Lincoln (E) (1-c lagoon in Basin 34) | 1-c lagoon | | | Aesthetic problems 82, 83 | 0-1 0 U 0 5-1 0 U | Poll Aff | X/12 | Eliminate and replace with 3-c lagoon/Low | Minor aesthetic improvement | Low-flow survey after upgrade | Refer to Compliance and Grants Admin. Sects. |
| Linn Ck | 1-c lagoon | | | Unknown due to gravel dredging operation | | | X/12 | Upgrade or replace/Low | None | Low-flow survey after upgrade | Refer to Compliance Sect. |
| Warsaw | 3-c lagoon | | | Green water, reduced benthos 83 | 0 1 P | Aff | | | | Low-flow survery after upgrade | Continued observation by R O |

Former Hulett Lagoon Site
Combined PA/SI
Reference 11

JOHN ASHCROFT
Governor

FREDERICK A. BRUNNER
Director

Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks and
Historic Preservation

STATE OF MISSOURI
# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
Jefferson City Regional Office
1001A Southwest Boulevard
P.O. Box 176
Jefferson City, MO 65102
314-751-2729

June 20, 1986 1.720 Camdenton

Ms. Trudy Marco
Grants Coordinator
City Hall
P.O. Box 399
Camdenton, MO 65020

Dear Ms. Marco:

Enclosed is the report and checklist from the audit of your approved Pretreatment Program implementation, as conducted by Leora M. Reising of my staff. If you have any questions concerning this report please call Leora M. Reising or Jerry Croy at (314) 751-2729.

Sincerely,

JEFFERSON CITY REGIONAL OFFICE

B.R. Kesler

B.R. Kesler
Regional Administrator

BRK/LR/ko

Enclosure

cc: Water Pollution Control Program, Attn: Rich Kuntz

Pretreatment Compliance Audit
City of Camdenton
NPDES Permit Numbers
C.P. White - MO-0048569
Dump - MO-0048585
Hulett - MO-0048577
Wilkerson-Clint - MO-0048607
Parish - MO-0048593

June 20, 1986

On April 15, 1986 an audit was conducted of the Industrial Pretreatment Program as implemented by the City of Camdenton, Ms. Trudy Marco and Mr. D. Roger Elder represented the city and Ms. Leora M. Reising represented the Missouri Department of Natural Resources.

The City of Camdenton received approval to implement the Industrial Pretreatment Program on September 26, 1983 by the Missouri Department of Natural Resources. The City of Camdenton operates five lagoons. However, only one lagoon is of interest to the Industrial Pretreatment Program, that is the Hulett (a.k.a. Factory) lagoon.

FINDINGS:

The City of Camdenton has jurisdiction over their entire collection and treatment system. They operate five lagoons, only one receives an industrial waste. The Hulett lagoon receives the waste from Sunstrand Tubular Products, Inc.

Sunstrand Tubular Products, Inc. is a manufacturer of aluminum and copper components and heat transfer coils for air conditioners, used in homes, automobiles, and various industries. The manufacturing process consists of aluminum and copper cutting and brazing, aluminum etching, and a small amount of chromium electroplating They have installed a pretreatment system to remove heavy metal components from their wastewater primarily from the aluminum etching process. The system was finished prior to the pretreatment audit but the reagent tanks were still being filled so it was not in operation.

The City of Camdenton has not developed their sampling, inspection, and permitting procedures. They need to address a variety of topics in their pretreatment program. An increase in personnel familiar with pretreatment and/or sampling and tracking procedures would be helpful. Parts of the program could be contracted to consultants.

The city personnel involved have been very conscientious but they are working with a handicap of not enough time and resources.

RECOMMENDATIONS:

1. Establish, document, and implement formal sampling procedures.
2. Pursue enforcement actions as specified by the federal pretreatment regulations.

3. Establish local limits with regards to production rates, method of waste treatment, method of sludge disposal, and NPDES discharge limits.

4. Have adequate personnel available or on contract for sampling, analyzing, monitoring, tracking, and enforcing the pretreatment program.

5. Up-date city ordinances and policies with any changes in the federal pretreatment program.

6. Submit all changes of your sewer use ordinance and pretreatment program to the Department of Natural Resources for approval.

Should you have any questions please call the Jefferson City Regional Office at (314) 751-2729.

Submitted By:

Leora M. Reising
Environmental Specialist

Approved By:

B.R. Kesler
Regional Administrator

LR/ko

Enclosure

INSPECTED BY Leora M. Reisinger DATE OF AUDIT 9/16/86

POTW PRETREATMENT PROGRAM AUDIT

1. General Information
   (A) NAME OF PERMITTEE: CITY OF CAMDENTON (B) NPDES # MO-0049577
   . HULETT (AKA. FACTORY)
   (C) MAILING ADDRESS: CITY HALL
   P.O. BOX 399
   CAMDENTON MO 65020
   (D) POTW ADDRESS: NONE
   (E) POTW REPRESENTATIVE: D. ROGER ELDER
   (F) TITLE: CITY ADMINISTRATOR
   (G) TELEPHONE NO: (314) 346-3600
   (H) PRETREATMENT PROGRAM APPROVAL DATE: 9/26/83
   PREVIOUS PRETREATMENT AUDIT: ___/___/___ NONE

2. POTW Information
   (A) DESIGN DRY WEATHER FLOW 26,500 GD ~~(mgd)~~
   (B) AVERAGE ANNUAL FLOW ________ (mgd)
   (C) PERCENT INDUSTRIAL FLOW UNKNOWN %
   (D) SEWER SYSTEM: SEPARATE X COMBINED ___
   (E) LEVEL OF TREATMENT: Primary................. ___ TYPE: LAGOON
   Secondary.............. X
   Advanced Secondary..... ___
   Tertiary............... ___
   (F) METHOD OF SLUDGE DISPOSAL: NOT APPL.

3. Summary of Program Evaluation

| | (S) | (U) | (R) | N/A |
|---|---|---|---|---|
| (A) Legal Authority | X | | | |
| (B) Local Limits | | | X | |
| (C) Inspection and Monitoring Procedures | | | X | |
| (D) Control Mechanism and Enforcement | | | X | |
| (E) POTW Records and Public Participation | | | X | |
| (F) Program Resources | | | X | |

(S) - Satisfactory (U) - Unsatisfactory

(R) - Revisions to Program Needed

# LEGAL AUTHORITY

1. POTW Jurisdiction

| | | Yes | No | N/A |
|---|---|---|---|---|
| (A) | Are all industrial contributions within the POTW's jurisdiction...................... | X | | |
| (B) | Is this jurisdictional situation as documented in the approved pretreatment program........... | X | | |
| | If not, have legal agreements/contacts been entered into with new jurisdictions........... | | | X |
| (C) | Are exiting pretreatment agreements with contributing jurisdictions proving to be effective for regulating IUs in those jurisdictions................................ | | | X |

COMMENTS:

2. Sewer Use Ordinance (SUO)

| | | Yes | No | N/A |
|---|---|---|---|---|
| (A) | Is the current SUO identical to that in the approved pretreatment program................. | X | | |
| | If not, were revisions approved by the State | | | |

If not, did unapproved changes occur to sections on:

- o General Prohibitions........................ ___
- o Specific Prohibitions....................... ___
- o Local Limits................................. ___
- o Categorical Standards....................... ___
- o Control Mechanisms.......................... ___
- o Inspection, Surveillance & Monitoring........ ___
- o Compliance & Enforcement.................... ___
- o Confidentiality Requirements................ ___
- o Special Agreements/Waivers.................. ___

COMMENTS:
A new SUO is being prepared.

3. Summary Evaluation of Legal Authority

| | (S) | (U) | (R) |
|---|---|---|---|
| COMMENTS: | X | | |

# LOCAL LIMITS

1. Status

| | Yes | No |
|---|---|---|
| (A) Does the POTW have local limits................ | X | |
| If yes, are local limits technically based..... | | X |
| (B) Do local limits exist for: | | |
| BOD........................................ | X | |
| TSS........................................ | X | |
| Ammonia.................................... | | |
| Cadmium.................................... | | |
| Chromium (T)............................... | X | |
| Chromium (VI).............................. | X | |
| Copper..................................... | X | |
| Cyanide.................................... | | |
| Mercury.................................... | | |
| Nickel..................................... | | |
| Silver..................................... | | |
| Zinc....................................... | X | |
| Phenols.................................... | | |
| Chlorinated Hydrocarbons (T)............... | X | |
| Other...................................... | | |

If yes specify oil & grease

| | Yes | No |
|---|---|---|
| (C) Are removal credits employed.................. | | X |
| (D) If there is more than one POTW treatment plant, are the local limits established specifically for each plant................................ | | X |

only for Hewlett

COMMENTS:

2. Categorical Industries

| | | |
|---|---|---|
| (A) Number of industries affected by Categorical Standards.................................... | 1 | |
| (B) Number of industries using the combined waste stream formula................................. | 0 | |
| (C) Number of industries with production based limits.......................................... | 0 | |
| (D) Are there categorical industries in the system for which the categorical standard is more stringent than the locally established limits.......................................... | | X |
| If yes: Is the more stringent limit in the control mechanism............................... | | |

COMMENTS:

3. Effectiveness of Local Limits

| | | | |
|---|---|---|---|
| (A) | Is POTW consistently meeting NPDES limits.... | | X |
| (B) | Has the POTW been free from industrial inhibition/upsets.............................. | | X |
| (C) | Are water quality standards being met........ | unknown | |
| (D) | Has the POTW been free of sludge contamination problems........................ | | X |
| (E) | Has toxicant sampling of POTW influent, effluent and sludge been conducted during the last year.................................. | | X |
| (F) | Does the POTW conduct biomonitoring analyses of the effluent...................... | unknown | |

COMMENTS:

4. Summary Evaluations of Local Limits

| | (S) | (U) | (R) |
|---|---|---|---|
| COMMENTS: | | X | |

Sundstrand installed its pretreatment equipment and had it operating this spring (April & May)

# INSPECTION AND MONITORING PROCEDURES

1. General

   (A) How many facilities were inspected in the last year.................................. 1   100%

   (B) How many facilities were sampled in the last year........................................ 0   0%

   (C) What percentage of inspections were announced.............................................. 0%

   (D) What percentage of sampling visits were announced.............................................. N/A %

   COMMENTS:

2. Procedures

| | | Yes | No |
|---|---|---|---|
| (A) | Are formal sampling and inspection procedures established................................ | | X |
| (B) | Are inspectors provided with safety equipment | X | |
| (C) | Are samples split with industry personnel.... | N/A | |
| (D) | Are all samples properly preserved........... | N/A | |
| (E) | Are chain-of-custody procedures employed..... | N/A | |
| (F) | Do all analyses conform to EPA methodologies. | N/A | |
| (G) | Is there a QA/QC program for sample analyses. | N/A | |

   COMMENTS: The city has not taken samples at Sunstrand.

3. Summary Inspection and Monitoring Evaluation

| | (S) | (U) | (R) |
|---|---|---|---|
| COMMENTS: | | | X |

# CONTROL MECHANISM AND ENFORCEMENT

Indicate the type(s) of control mechanism employed:

| | |
|---|---|
| Permit System............... | ____ |
| Contracts................... | ____ |
| Sewer Use Ordinance......... | X |
| Other....................... | ____ Specify: ________ |

1. Control Mechanism

| | Yes | No | N/A |
|---|---|---|---|
| (A) Is the control mechanism as described in the approved program............................... | X | | |
| (B) Are all significant industrial users regulated through the control mechanism.................. | | | X |
| (C) Are permits/contracts: | | | |
| o For a limited duration........................ | | | X |
| o Non-transferrable........................... | | | X |
| o Revocable..................................... | | | X |
| o Able to be modified........................... | | | X |
| (D) Do permits/contracts: | | | |
| o Contain local limits.......................... | | | X |
| o Contain categorical standards................ | | | X |
| o Contain compliance schedules................. | | | X |

COMMENTS:

2. Noncompliance and Enforcement

| | | | |
|---|---|---|---|
| (A) How many categorical industrial users (CIUs) were found to be out of compliance with local or categorical discharge limits (whichever is more stringent) during the past year.......... | 1 | | |
| How many of these CIUs regained compliance during the same period of time................ | 0 | | |
| (B) How many significant industrial users (SIUs) were found to be out of compliance with local discharge limits during the past year......... | | | N/A |
| How many of these SIUs regained compliance during the same period of time................ | | | N/A |

(C) List enforcement actions taken to bring violators into compliance.

| Administrative | Yes | No | How many times |
|---|---|---|---|
| o Verbal warning | X | | |
| o Written warning | X | | |
| o Notice of violation letter | | X | |
| o Compliance schedule | | X | |
| o Revoke permit | | X | |
| o Termination of service | | X | |
| o Other (specify) | | X | |

| Legal | Yes | No | How many times |
|---|---|---|---|
| o Consent decree | | X | |
| o Civil penalties | | X | |
| o Criminal penalties | | X | |
| o Injunctive relief | | X | |
| o Other (specify) | | X | |

(D) How many IUs are currently operating under a compliance shcedule to correct discharge violations.................................. 1

(E) What percentage of all IUs regulated under the POTW pretreatment program are in compliance with pretreatment standards at the present time 0

COMMENTS:

3. Summary Control Mechanism & Enforcement Evaluation

| | (S) | (U) | (R) |
|---|---|---|---|
| COMMENTS: | | | X |

# POTW RECORDS AND PUBLIC PARTICIPATION

1. Industrial Waste Survey (IWS)

| | Yes | No |
|---|---|---|
| (A) Is the IWS periodically updated.................. | | X |
| (B) Have all new industrial discharges been adequately characterized.......................... | X | |
| (C) Have any industries been removed from the list of significant dischargers.................. | | X |

COMMENTS:

2. Report Review & Analysis

| | Yes | No |
|---|---|---|
| (A) Are inspection and sampling records well organized and readily retrievable................. | X | |
| (B) Are sampling results checked against discharge standards........................................ | N/A | |
| (C) Are appropriate actions taken in response to problem monitoring reports....................... | N/A | |
| (D) Are all records maintained for 3 years........... | X | |

COMMENTS: No sampling has been done

3. Industrial Reporting

| | Yes | No |
|---|---|---|
| (A) Has the POTW required self-monitoring reports from industrial users in accordance with categorical standards............................ | X | |
| (B) Has the POTW required submission of baseline monitoring reports.............................. | X | |
| (C) Are self-monitoring reports and BMR verified by field inspections............................... | X | |

COMMENTS:

4. Public Participation

| | Yes | No | N/A |
|---|---|---|---|
| (A) Did the POTW publish an annual notice of violators in local newspapers.................... | | X | |
| (B) Are all program records available to the public.. | X | | |
| (C) Has public comment been solicited during revisions to the SUO and or local limits......... | X | | |

COMMENTS:

5. Summary POTW Records and Public Participation Evaluation

| | (S) | (U) | (R) |
|---|---|---|---|
| COMMENTS: | | | X |

# PROGRAM RESOURCES

1. Manpower

| | Yes | No |
|---|---|---|
| (A) Are adequate personnel provided in the following areas: | | |
| o Sampling | | X |
| o Sample analyses | N/A | |
| o Inspection | | X |
| o Administration | X | |
| o Legal | X | |
| o Technical Review | | |
| (B) Do available personnel have appropriate training | | X |
| (C) Is a commercial lab used | | |

If yes, for what analyses: ______

COMMENTS:

2. Equipment

| | Yes | No |
|---|---|---|
| (A) Is adequate sampling equipment available | | |
| (B) Is adequate safety equipment available | | |
| (C) Are an adequate number of vehicles available | | |
| (D) Is the analytical lab adequately equipped | | |

COMMENTS:

3. Funding

| | Yes | No |
|---|---|---|
| (A) Is the program adequately funded | | |
| (B) Is funding expected to continue at an adequate level | | |

COMMENTS:

4. Summary Evaluation of Resources

| | (S) | (U) | (R) |
|---|---|---|---|
| COMMENTS: | | | X |

Former Hulett Lagoon Site
Combined PA/SI
Reference 12

SUNDSTRAND

Victoria M. Haines
Environmental, Health & Safety Counsel

Direct Dial: 815-226-6136
Law Dept. Fax: 815-226-3202
e-mail: ccglath@snds.com

February 5, 1999

RECEIVED

FEB 8 1999

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Valerie Wilder
Environmental Specialist
Hazardous Waste Program
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

**RE: Missouri Department of Natural Resources' December 18, 1998 Letter Preliminary Assessment/Site Inspection - Former Hulett Lagoon**

Dear Ms. Wilder:

This letter and attachments are voluntarily submitted on behalf of Sundstrand Corporation ("Sundstrand") in response to the Missouri Department of Natural Resources' ("MDNR") December 18, 1998 letter to Sundstrand requesting written responses to specific questions set forth in the letter. It is Sundstrand's understanding that this is not a "notification and request for information" pursuant to 104(e) of the Comprehensive, Environmental Response, Compensation & Liability Act of 1980, as amended, ("CERCLA"), given the MDNR does not have the authority to issue such a request. Rather this request is made as part of MDNR's Preliminary Assessment /Site Inspection under CERCLA at the former Hulett Lagoon, a closed lagoon which was part of the City of Camdenton's publicly owned wastewater treatment facility ("POTW") permitted under the Clean Water Act. Nevertheless, Sundstrand is voluntarily providing responses and documents to this request as well as identifying appropriate references to the Modine Manufacturing Company ("Modine") and MDNR files.

By cooperating with the MDNR, Sundstrand does not waive any rights or defenses that it may have to this or subsequent requests or actions. The responses to any of the questions in the attachment should not be construed as an admission of any liability on the part of Sundstrand. Further, none of the material or responses supplied



4949 Harrison Avenue, Post Office Box 7003, Rockford, Illinois 61125-7003
Telephone 815.226.6000 • Fax 815.226.2699

herein should be construed as an admission of wrong-doing or evidence of any violation of federal, state, or local statutes or ordinances.

In summary, Sundstrand's understanding is that the former Sundstrand Tubular Products facility ("Facility"), located in Camdenton, Missouri, and operated from 1972 to 1990, did discharge wastewater into the City of Camdenton's sewer system as authorized by the Missouri Clean Water Act and pursuant to a pretreatment permit. Sundstrand is currently unaware of any waste containing TCE which was disposed of by Sundstrand at or near the Hulett Lagoon other than through the sewer system. It is our understanding that Modine, the current owner of the Facility is undergoing RCRA closure and is testing and remediating the soils and groundwater pursuant to RCRA regulations. Historical documents regarding the use and disposal of hazardous substances were left at the site when the Facility was sold to Modine. Any spills or other releases at the Facility may be documented in Modine's records.

Attached is the information requested in the letter and the documents which support the responses. Although a number of the questions were unclear in certain areas, Sundstrand has provided the information it interpreted the questions to be requesting, instead of objecting to the questions. This was done to facilitate MDNR's inspection time frame. If the MDNR believes that the question was not interpreted properly, Sundstrand will try to be responsive once notified of the discrepancy.

Finally, when Sundstrand sold Sundstrand Tubular Products, Inc. to Modine, a viable corporation continued to exist and operate out of the facility. It therefore seems more efficient, productive and appropriate for the MDNR to seek further information or any remedial actions from the current owner/operator of the Facility, Modine, rather that Sundstrand.

If you have any questions concerning this response, please do not hesitate to call me at 815-226-6136.

Very truly yours,

SUNDSTRAND CORPORATION

Victoria H

Victoria M. Haines

VMH:cmm

652186.1

**Sundstrand Corporation's Response to the MDNR's December 18, 1998 Letter**
**Former Hulett Lagoon, Camdenton, Missouri**
**Combined Preliminary Assessment/Site Inspection**

1. State when Sundstrand Corporation or Sundstrand Tubular Products acquired any interest in or ownership in the site located at 179 Sunset Drive, Camdenton, Missouri, or portion thereof. Provide copies of all documents evidencing or relating to such ownership or interest, including, but not limited to purchase agreements, deeds, or leases, etc.

In 1972 Sundstrand Corporation incorporated Dawson Metal Products, Inc. ("Products"), a Delaware Corporation, as a wholly owned subsidiary of Sundstrand Corporation ("Sundstrand"). On June 29, 1972, Products acquired the business and assets of Dawson Metal Products, Inc. ("Dawson"), a Kansas Corporation. In connection with the acquisition Products, the Delaware corporation, by way of assignment, acquired a leasehold interest in the Sunset Drive property. See Attachment 1. After the acquisition was complete, Dawson, the Kansas corporation, continued in existence.

Sundstrand believes the Sunset Drive property was held by Dawson, the Kansas corporation, pursuant to a lease dated November 28, 1966 between Dawson and the Camdenton Industrial Development Corporation. See Attachment 2. The lease had a term of ten years (which is believed to have commenced July 1, 1967) with an option to Dawson to purchase.

Products, the Delaware corporation, changed its name to Sundstrand Tubular Products, Inc. ("Sundstrand Tubular") on May 25, 1977.

By agreement dated August 24, 1990 Sundstrand agreed to sell the business and assets of Sundstrand Tubular to Modine Manufacturing Company ("Modine"). This transaction was closed on October 18, 1990 and the Sunset Drive property of Products was transferred to Modine by deed dated around October 18, 1990.

On November 27, 1990, Products changed its name to Sundstrand Camdenton, Inc. and on March 15, 1994 Sundstrand Camdenton, Inc. was liquidated.

2. State how long Sundstrand Corporation or Sundstrand Tubular Products held interest or ownership in the site at 179 Sunset Drive, Camdenton, Missouri. State the current status of the Sundstrand Tubular Products Corporation. Provide copies of all documents evidencing or relating to the sale, dissolution, or termination of Sundstrand Tubular Products.

See Response #1.

3. Identify the physical characteristics of the facility during Sundstrand's operations. Provide a facility map showing the location of surface and subsurface features. Include the following in your description:

a. Surface structures (e.g., buildings, tanks, etc.);

b. Underground tanks, pits, and/or vats;

c. Subsurface pipelines, utility lines, sewage and drainage systems; and

d. All construction, alterations, renovations, and/or demolition of the items in 4.a. through 4.c. above.

The Sundstrand Tubular facility ("Facility") was a metal-sided manufacturing facility of approximately 100,000 sq. ft. It was originally constructed by Dawson in 1968 with additions in 1971, 1973, 1977 and 1983. There were no underground storage tanks located at the Facility. The Facility had four small concrete mud pits used to settle solids along the west exterior wall. See Attachment 3. See also MDNR's RCRA files.

4. Describe all processes performed at the facility.

Sundstrand Tubular manufactured heat transfer components for commercial and automotive industries at the Facility. The manufacturing process flowed as follows:

a. Copper and aluminum tubing were fed from rolls to benders to form U shapes and then cut off;

b. Parts were then immersed in alkaline cleaning lines to remove oil and chips;

c. Parts were degreased to remove any remaining oil;

d. Clean parts were assembled and small U shaped copper tubing and aluminum tubing ends were brazed to assembled cores using manual and automatic brazing systems;

e. The assembled heat transfer components were degreased and/or alkaline cleaned and then tightness tested using refrigerant; and

f. Finally, the components were then painted if required by the customer and packaged for shipment. See Attachment 4.

5. Did Sundstrand ever transport to the facility or use, purchase, generate, store, treat, dispose or otherwise handle any hazardous materials at the facility? If the answer to this question is anything but an unqualified a "no," identify:

a. The chemical composition, characteristics, physical state (e.g., solid, liquid) of each hazardous materials transported, used, purchased, generated, stored, treated, disposed or otherwise handled;

b. For each such hazardous material used, state how, when, where and in what quantities the hazardous material was purchased, used, generated, stored, treated, transported, disposed or otherwise handled;

c. Any analyses conducted of the hazardous material so transported, used, purchased, generated, stored, treated, disposed, or otherwise handled, and provide copies of such analyses.

Sundstrand is interpreting the term facility used in this question to mean the manufacturing facility and not the Hulett Lagoon. Purchase and consumption records of materials were maintained solely by Sundstrand Tubular during its operation of the business at the time of Sundstrand Tubular's sale to Modine. Sundstrand believes that Sundstrand Tubular submitted a SARA Tier 2 submittal to the USEPA and State of Missouri in 1989. If the documents still exist, they would be on site and maintained by Modine. (Sundstrand did not take possession of these documents at the time of Sundstrand Tubular's sale to Modine.) See also the MDNR's RCRA files.

6. Did Sundstrand arrange for transportation, disposal or treatment of waste materials, including hazardous substances to the facility? If the answer to this question is anything but an unqualified "no," identify:

a. The persons with whom you made such arrangements;

b. The type of arrangements made;

c. Every date on which such arrangements or shipments took place;

d. The total quantity of waste materials or hazardous substances transported to the site;

e. The amount paid or collected in connection with each transaction, the method of payment, and the identity of the person from whom payment was given or received;

f. The names and addresses of any persons who transported waste materials or

hazardous substances to the site;

g. All documents containing information responsive to subparts a. through f. of this question.

No. Sundstrand Tubular was not a commercial transport, storage and disposal facility and did not bring hazardous wastes onto the Facility for any purpose.

7. Identify to the best of your ability whether any leaks, spills, releases or threats of releases of any kind into the environment of any hazardous materials have or may have occurred at the Sundstrand facility. If yes, please provide the following:

a. When such releases occurred,

b. How the releases occurred,

c. What hazardous substances were released,

d. What amount of each such hazardous substance was so released,

e. Where such releases occurred,

f. Any and all activities undertaken in response to each such release; and

Sundstrand is aware of two potential releases at the Facility. Pursuant to former Dawson employees, a fire broke out at the Facility in the 1960's. In fighting the fire, a washdown occurred in an area where trichloroethylene ("TCE") was utilized. A second alleged release of 4500 gallons of TCE was anonymously reported to the MDNR August 9, 1990. Sundstrand has investigated both situations and concluded that neither release had occurred. Subsequent investigations by Modine in November 1991 and by MDNR in March 1993 also could not confirm that the releases had occurred. See Attachment 5. See also MDNR's RCRA files.

8. State whether, at the time Sundstrand acquired the facility, there was any reason to know or suspect that any hazardous substances were disposed or spilled on, in or at the site.

No.

9. Please submit information on all persons and how they may be contacted (include current work and home addresses and phone numbers) with information relating to any of the above questions.

Mark Chiado, Sundstrand Corporation, Manager, Environmental Planning & Auditing, 815-226-6351

Victoria Haines, Sundstrand Corporation, Environmental, Health & Safety Counsel, 815-226-6136

William R. Coole, Sundstrand Corporation, Associate General Counsel, 815-226-6303

Tom Misiak, The Falk Corporation, President, 414-937-4777

Robert Miller, Sundstrand Corporation, Director, Environmental, Health & Safety, 815-226-2755

William Johnson, Sundstrand Corporation, Risk Manager, 815-226-7820

10. Please indicate whether any of the following individuals are currently employed with Sundstrand Corporation or any subsidiary thereof (include current position/title, work and home addresses and phone numbers):

**William R. Coole***
**Paul Donovan***
James W. Ethington
Kenelm Groff
Lloyd E. Larson
LeMoyne G. Loseke
Charles E. Martin
Frank G. Malewitz
Thomas F. Otto
Philip W. Polgreen
Ted L. Ross
Richard M. Schilling
**Neil D. Traubenberg***
Berger G. ("Bud") Wallin
Donald M. Wills

**individuals still employed.**

statements therein contained are true.

Genevieve Moroske
Notary Public

My Commission expires: May 31, 1974

Former Hulett Lagoon Site
Combined PA/SI
Reference 13

# State of Delaware

**Office of Secretary of State.**

I, Walton H. Simpson, *Secretary of State of the State of Delaware,* **do hereby certify** that the Certificate of Incorporation of the "DAWSON METAL PRODUCTS, INC.", was received and filed in this office the twelfth day of June, A.D. 1972, at 10 o'clock A.M.;

And I do hereby further certify that the aforesaid Corporation is duly incorporated under the laws of the State of Delaware and is in good standing and has a legal corporate existence so far as the records of this office show and is duly authorized to transact business.

**In Testimony Whereof,** *I have hereunto set my hand* and official seal at Dover this thirteenth day of June in the year of our Lord one thousand nine hundred and seventy-two.

Walton H Simpson

*Secretary of State*

R N Caldwell

*Ass't Secretary of State*

No.....F-157085..........

Former Hulett Lagoon Site
Combined PA/SI
Reference 14

# STATE

JAMES C. KIRKPATRICK, Secretary of State

CORPORATION DIVISION

SEAL OF THE SECRETARY OF STATE MISSOURI

# Certificate of Authority

WHEREAS, DAWSON METAL PRODUCTS, INC.

(using in Missouri the name DAWSON METAL PRODUCTS, INC. )

incorporated under the Laws of the State of DELAWARE for a term

of perpetual years and now in existence and in good standing in said State has filed in the office of the Secretary of State, duly authenticated evidence of its incorporation, as provided by law, and has, in all respects, complied with the requirements of General and Business Corporation Law governing Foreign Corporations;

NOW, THEREFORE, I, JAMES C. KIRKPATRICK, Secretary of State of the State of Missouri, by virtue of the authority vested in me, do hereby certify that said corporation is from the date hereof duly authorized to carry on the business of

Sale and distribution of air conditioning equipment and related parts.

in the State of Missouri, and is entitled to all rights and privileges granted to Foreign Corporations under The General and Business Corporation Law; that the entire amount of its stated capital and surplus is $654,558.00 and $1,000.00 of the amount of stated capital of said corporation is represented by 1,000 shares of common @ $1.00

that the proportion of stated capital and surplus represented in Missouri is $ 647,716.00

and that its registered office in Missouri is located at 314 North Broadway, St. Louis

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the GREAT SEAL of the State of Missouri, at the City of Jefferson, this 25th day of September, 1972.

James C. Kirkpatrick
Secretary of State

RECEIVED OF: DAWSON METAL PRODUCTS, INC.

Seven hundred sixty-eight and no/00---------- Dollars, $ 768.00

For Credit of General Revenue Fund, on Account of Incorporation Tax and Fee.

No. F-157085

Dorothymae Miller
Deputy Collector of Revenue

CORP #14

State of Missouri · · · Office c

Former Hulett Lagoon Site
Combined PA/SI
Reference 15

## APPLICATION FOR AN AMENDED CE
## FOR A FOREIGN COR

(To be submitted in duplicate by an attorney)

HONORABLE JAMES C. KIRKPATRICK
SECRETARY OF STATE
STATE OF MISSOURI
JEFFERSON CITY, MO. 65102

SUNDSTRAND TUBULAR PRODUCTS, INC., formerly Dawson Metal / Products, Inc., a corporation, pursuant to the provisions of "The General and Business Corporation Law of Missouri" relating to amended certificate of authority of Foreign Corporation, does hereby state,

(1) Its name is Sundstrand Tubular Products, Inc.;

it was incorporated in the State of Delaware; and it was qualified in the State of Missouri on September 25, 1972

(2) The name it will use in Missouri is Sundstrand Tubular Products, Inc.

(3) The address of its principal office in the state or country of organization is

Sunset Drive, Camdenton, Missouri 65020

(Include street and number, if any.)

(4) The address of its registered agent in Missouri is

314 North Broadway, St. Louis, Missouri 63102

(Include street and number, if any.)

and the name of registered agent in Missouri at such address is

C T Corporation System

(5) The corporation is qualified under the following states and countries other than Missouri:

NONE

FILED
AND AMENDED CERTIFICATE OF
AUTHORITY ISSUED
AUG 29 1977
James C. Kirkpatrick
Corporation Dept. SECRETARY OF STATE

(6) By appropriate corporate action on May 25, 1977, the corporation:

1. Changed its corporate name to Sundstrand Tubular Products, Inc.

2. ~~Changed its period of duration to~~

(MO. - 276 - 11/20/68)

[redacted] (restate purposes if changed)

(8) There is attached hereto a Certificate of the Secretary of State of the State of Delaware relating to the amendment(s), set forth in item 6 above and showing that the Corporation is in existence and in good standing in said State.

IN WITNESS WHEREOF, the undersigned corporation has caused this application to be executed in its name by its President ~~or Vice President~~ attested by its Secretary ~~or Assistant Secretary~~, this 15th day of July, 19 77.

SUNDSTRAND TUBULAR PRODUCTS, INC.
(Exact Corporate Name)

(CORPORATE SEAL)

By LeMoyne G. Loseke
President
LeMoyne G. Loseke

ATTEST:

R. M. Schilling
Secretary
Richard M. Schilling

STATE OF ILLINOIS } ss
COUNTY OF WINNEBAGO }

I, Suzanne L. Lowe, a notary public, do hereby certify that on this 15th day of July, 19 77, personally appeared before me LeMoyne G. Loseke, who, being by me first duly sworn, declared that he is the President of Sundstrand Tubular Products, Inc., that he signed the foregoing document as President of the corporation, and that the statements therein contained are true.

PLACE NOTARY SEAL HERE

Suzanne L. Lowe
Notary Public

My Commission expires: September 29, 1980

FILED
AND AMENDED CERTIFICATE OF AUTHORITY ISSUED
AUG 29 1977
James Kirkpatrick
Corporation Dept. SECRETARY OF STATE

[redacted]

Former Hulett Lagoon Site
Combined PA/SI
Reference 17

No. F00157085

# STATE OF MISSOURI

ROY D. BLUNT, Secretary of State

CORPORATION DIVISION

## Certificate of Withdrawal

WHEREAS, an Application for Withdrawal of

SUNDSTRAND TUBULAR PRODUCTS, INC.

a DELAWARE corporation, has been received, found to conform to law, and filed;

NOW, THEREFORE, I, ROY D. BLUNT, Secretary of State of the State of Missouri, issue this Certificate of Withdrawal, certifying that the afornamed corporation is withdrawn from this state.

IN TESTIMONY WHEREOF, I hereunto set my hand and affix the GREAT SEAL of the State of Missouri. Done at the City of Jefferson, this 18th day of APRIL, 19 91.

Roy D. Blunt

Secretary of State

Corp #27 (1-85)

Former Hulett Lagoon Site
Combined PA/SI
Reference 18

# ENVIRONMENTAL SITE ASSESSMENT

MODINE HEAT TRANSFER, INC.
POST OFFICE BOX 636 SUNSET DRIVE
CAMDENTON, MISSOURI

PREPARED FOR:

MODINE MANUFACTURING COMPANY
1500 DEKOVEN AVENUE
RACINE, WISCONSIN

RECEIVED
DEC 23 1991
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

PREPARED BY:

LAW ENVIRONMENTAL, INC.
911 WASHINGTON AVENUE, SUITE 160
ST. LOUIS, MISSOURI

LAW ENVIRONMENTAL PROJECT NO. 53-1543

NOVEMBER 1991

## TABLE OF CONTENTS

## 1.0 BACKGROUND INFORMATION

The project site is a manufacturing plant located in Camdenton, Missouri (Figure 1). The plant formerly operated as the Sundstrand Tubular Product, Inc. facility, a subsidiary of the Sundstrand Corporation, prior to the October 19, 1990 acquisition by Modine Heat Transfer, Inc., a subsidiary of the Modine Manufacturing Company. The plant is currently operating as the Modine Heat Transfer, Inc. facility producing heat transfer products, and is a RCRA generator. It is our understanding that the facility has submitted a Part B operating permit application and is currently operating under interim status.

The plant has used 1,1,1-trichloroethane (TCA) for degreasing operations since December, 1990. The plant generated trichloroethylene (TCE) waste during degreasing operations from the early 1970's to December 1990. According to information obtained from Modine Manufacturing Company, the TCE waste was containerized in 55 gallon drums and stored outside the plant in two separate locations from the early 1970's to 1983. One area of storage was located along the south outer wall of the plant where the drums were placed on a concrete pad (Area 1). The Missouri Department of Natural Resources suggested to Modine that an alleged 4,500 gallon release of spent solvent occurred at the plant. It is our understanding that a building addition was erected over the spill area in 1983. Another storage area was located along the outer west wall of the plant building (Area 2). Information pertaining to the exact location and leak history of this storage area is not readily available to Law Environmental at this time. Figure 2 is a generalized site plan showing locations of Areas 1 and 2.

## 2.0 PURPOSE

The purpose of this project was to assess site soil in Areas 1 and 2 for the presence of TCE. The tasks performed include drilling soil borings for the purpose of collecting soil samples for laboratory analyses and preparation of this summary report.

## 3.0 WORK COMPLETED

Five soil borings were drilled in an area where Don Mans of Modine believed the leakage of the TCE from the fifteen 55-gallon drums occurred (Area 1). Three of these borings (HA-1, HA-2, and HA-3) were drilled from the plant floor surface and two of these borings (HA-4 and HA-5) were drilled from the floor of the degreasing machine pit. The floor of the degreasing machine pit is approximately 5.5 feet below the plant floor surface. See Figure 2 for location of Area 1 and Figure 3 for a detail map of Area 1 showing boring locations. The concrete floor of the plant was cored by the use of an electric core drill. Borings were drilled and soil samples collected by the use of a hand auger. Soil samples were collected at two foot intervals to a depth at which the hand auger refused to advance.

Former Hulett Lagoon Site
Combined PA/SI
Reference 19

1.200 Camdenton
MO-0048577; MO-0048593
MO-0048569; MO-0048585
MO-0048607

September 13, 1978

Honorable Ken Mensendiek, Mayor
City of Camdenton
112 Court Circle
Camdenton, Missouri 65020

recorded
5 outfalls

Dear Mayor Mensendiek:

An inspection was conducted of the operation and condition of the wastewater treatment facilities serving the City of Camdenton, Missouri on September 7, 1978. The following unsatisfactory features were observed and recommendations are hereby made for their correction.

UNSATISFACTORY FEATURES:

1. The Hulett Lagoon (#3) is short circuiting the industrial waste.

2. The industrial waste entering the Hulett lagoon appears to kill off the south end of lagoon reducing the facility's effective size.

3. The Clint Lagoon needs its own NPDES permit.

COMMENTS:

The sewage lagoons serving Camdenton seemed for the most part to be well maintained. The Hulett Lagoon, however has a large problem with its industrial influent. The sewage from Sunstrand enters the lagoon at the south end, which is the same end that the discharge pipe is on. The detention time for the industrial waste could not be more than a few hours, far too short a period to treat the waste.

To correct the short circuiting problem, the location of the influent pipe from Sunstrand should be moved to the north end of the lagoon, or the sewage line could be tied in to the other influent line already at the north end.

The strength of the industrial sewage entering Hulett Lagoon is apparently too great for the facility to handle. The City should enforce its sewer use ordinance, if it has one, to prevent misuse of the sewers and sewage treatment facilities.

Our records show no response by the City toward obtaining a permit for the discharge from the Clint Lagoon. It currently is listed in the NPDES Permit #MO-0048607 as the first cell of a two cell lagoon. It has, however, its own discharge point and therefore needs its own permit. Either the effluent pipe in Clint Lagoon shall be capped or a permit shall be applied for from this department. The appropriate forms are enclosed.

RECOMMENDATIONS:

1. Correct the short circuiting in Hulett Lagoon.

2. Enforce or create sewer use ordinances.

3. Apply for discharge permits for Clint and Wilkerson Lagoons.

Sincerely,

Todd Crawford
Environmental Engineer

TC/bc

Enclosures

CC: Jeff Hancock, City Administrator

78-82



ENGINEERING GEOLOGIC REPORT ON COLLAPSE POTENTIAL OF CA

CAMDEN COUNTY, MISSOURI

LOCATION: White Lagoons, SW¼, SW¼, NE¼, Sec. 35, T. 38 N., R. 17 W., Macks Creek Quad.
Hulett Lagoon, SW¼, SW¼, SW¼, Sec. 24, T. 38 N., R. 17 W., Macks Creek Quad.
Clint Lagoons, NE¼, NE¼, SW¼, Sec. 24, T. 38 N., R. 17 W., Camdenton Quad.
Parish Lagoon, SE¼, SW¼, NE¼, Sec. 19, T. 38 N., R. 16 W., Camdenton Quad.
Dump Lagoons, NW¼, SW¼, SE¼, Sec. 25, T. 38 N., R. 17 W., Stoutland Quad.

RESULTS:

Investigation of lagoons for the City of Camdenton occurred on September 12, 1978 by Gary St. Ivany and John W. Whitfield. The Camdenton area is underlain by the Gasconade dolomite formation. Layers of chert (one exposed bed was 12 feet thick) and Gunter sandstone were present in the stream beds. Streams were intermittent, with isolated pools and discharge effluent composing most of the flow. Possibilities exist for localized groundwater pollution effecting shallow and poorly cased wells to some extent. Streams in the area drain into Lake of the Ozarks.

The Camdenton lagoons should not be considered in danger of failure by catastrophic collapse, but localized groundwater pollution is possible. For these reasons, the lagoons are designated as Category 2.

Problems exist at the Hulett lagoon site which appear to be design related and not geologic. Effluent was observed bubbling up approximately 40 feet from the discharge pipe. This area appeared to be solid effluent to within 6 inches of the surface. An open channel existed directly from the inlet pipe to the discharge pipe, thus, causing a short circuit. On closer examination, the thick effluent was not solid but floating. It was possible to extend a rod through the effluent to the bottom of the lagoon. Discharge from the lagoon was dark green in color with a thick white foam floating on the surface. If a short circuit does exist in the Hulett lagoon, corrective measures are needed. A possible solution is the location of the inlet pipe at the opposite end of the lagoon to where the discharge pipe is stationed.

This situation may be a result of effluent from the metal fabricating plant that discharges into this lagoon.

John W. Whitfield

John W. Whitfield, Geologist
Applied Engineering & Urban Geology
Geology & Land Survey
September 14, 1978

Gary St. Ivany

Gary St. Ivany, Lab Technician
Applied Engineering & Urban Geology
Geology & Land Survey
September 14, 1978

Up · Og
Low · Ogg

orig: Jim Odendahl

Fil. 100 Camdenton

called to Ja
July 24. Said
made & result
in early August

Former Hulett Lagoon Site
Combined PA/SI
Reference 21

June 21, 1984

JUN 25 1984

C O P Y

Mr. Frank Dolan, P.E.
Environmental Engineer
Mo. Department of Natural Resources
P.O. Box 1368
Jefferson City, Missouri 65102

RE: Test results from Camdenton

Dear Mr. Dolan:

Attached is a copy of the test results for Camdenton's Factory Lagoon. The City will be performing another series of tests but, because of the expense we would appreciate your input concerning the actual items requiring retesting. The City will meet with you now or after the second test results are available. Please contact me or Mr. Buc Riley concerning the tests needed and if we need to schedule a meeting at this time.

If you ahve any questions please feel free to contact me or Mr. Riley.

Sincerely,

James C. Jackson, P.E.

JCJ:sw
enc.
cc: Mr. Curtis Ogg
City of Camdenton

MMTL
Analytical Services

Columbia, MO [illegible]
314/874-8080

114 East Elm, Suite 3
O'Fallon, MO 63366
314/281-2858

Client: Camdenton, City of
PO Box 399
Camdenton MO 65020

Date Reported: 06/15/[illegible]
Date Sampled: 05/22/84
Date Received: 05/23/84

Attention: Bud Riley

MMTL Report No: 17509

Customer P. O. Number: 20502

MMTL Account No: 10238

REPORT OF ANALYSIS

| Sample No. | Units | Results |
|---|---|---|
| SAMPLE #1 | | |
| Residue, Total Suspended | MG/L | 2 |
| Total Chromium | MG/L | < .02 |
| Chromium, Hexavalent | MG/L | < .02 |
| Total Copper | MG/L | < .02 |
| Total Zinc | MG/L | .04 |
| SAMPLE #2 | | |
| Residue, Total Suspended | MG/L | 37 |
| Total Chromium | MG/L | .28 |
| Chromium, Hexavalent | MG/L | < .02 |
| Total Copper | MG/L | 2.3 |
| Total Zinc | MG/L | .12 |
| Halomethanes | | * |
| Toluene | UG/L | < 10 |
| Trichloroethylene | UG/L | 28 |
| Grease & Oil, gravimetric | MG/L | 41 |
| SAMPLE #3 | | |
| Residue, Total Suspended | MG/L | 6 |
| Total Copper | MG/L | .11 |
| Total Zinc | MG/L | .20 |
| Grease & Oil, gravimetric | MG/L | < 5 |
| SAMPLE #5 | | |
| Total Chromium | MG/L | 18 |
| Total Copper | MG/L | 1400 |
| Total Zinc | MG/L | 100 |
| Per Cent Dry Solids | % | 3.0 |

Handwritten notes: Sample #1: "Moon Lake"; Sample #2: "effluent from lagoon"; Sample #3: "effluent from Hauser"; Sample #5: "from lagoon"

Comments:
*See attached table.

Approved by: [signature]

Page No. 1

Sample #2

| Name | Sample Concentration ug/L |
|---|---|
| Bis(2-chloroisopropyl) ether | <1 |
| Bis(2-chloroethyl) ether | 10 |
| Bis(2-chloroethoxy) methane | <1 |
| 4-Chlorophenyl phenyl ether | 10 |
| 4-Bromophenyl phenyl ether | <5 |

MMTL
Analytical Services

314/874 8080

114 East Elm Suite 3
O'Fallon, MO 63366
314/281-2858

Client: Sunstrand Tubular Products, Inc.
PO Box 636, Sunset Drive
Camdenton MO 65020

Date Reported: 06/15/
Date Sampled: 05/22/84
Date Received: 05/23/84

Attention: Don Mans

MMTL Report No: 1751

Customer P. O. Number: 1518

MMTL Account No: 10109

REPORT OF ANALYSIS

| Sample No. | Units | Results |
|---|---|---|
| SAMPLE #4 | | |
| Residue, Total Suspended | MG/L | 16 |
| Total Chromium | MG/L | < .02 |
| Chromium, Hexavalent | MG/L | < .02 |
| Total Copper | MG/L | .51 |
| Total Zinc | MG/L | .30 |
| Haloethers | | * |
| Toluene | UG/L | 15 |
| Trichloroethylene | UG/L | 41 |
| Grease & Oil, gravimetric | MG/L | 18 |

from Sunstrand

Comments:
*See attached table

Approved by:

Sample #4

| Name | Sample Concentration ug/L |
|---|---|
| Bis(2-chloroisopropyl) ether | <1 |
| Bis(2-chloroethyl) ether | 140 |
| Bis(2-chloroethoxy) methane | <1 |
| 4-Chlorophenyl phenyl ether | 5 |
| 4-Bromophenyl phenyl ether | <5 |

Report Number 17693-1

| Name | Sample Concentration ug/L |
|---|---|
| Bis(2-chloroispropyl) ether | 1500 |
| Bis(2-chloroethyl) ether | 190 |
| Bis(2-chloroethoxy) methane | 34 |
| 4-Chlorophenyl phenyl ether | <5 |
| 4-Bromophenyl phenyl ether | <5 |

Report Number 17692-1 sample from lagoon AUG 22 1984

| Name | Sample Concentration ug/L |
|---|---|
| Bis(2-chloroispropyl) ether | 29 |
| Bis(2-chloroethyl) ether | 250 |
| Bis(2-chloroethoxy) methane | 320 |
| 4-Chlorophenyl phenyl ether | <5 |
| 4-Bromophenyl phenyl ether | <5 |

Former Hulett Lagoon Site
Combined PA/SI
Reference 22

City of Camden
112 Court Circle P.O. Box 3
Camdenton, Mo. 65020
314 346 3600

August 20, 1984

Mr. Frank Dolan
Department of Natural Resources
P.O. Box 1368
Jefferson City, Missouri 65102

Dear Mr. Dolan:

This is to confirm our meeting for Monday, August 27, 1984 at 10:00 AM, at City Hall on the pre-treatment program.

Enclosed you will find the second sample results.

Sincerely,

Warren W. Riley, Jr.
City Administrator

WWR/kb

cc: Mayor Kelsey
Mr. Jim Jackson, Jackson Engineering
Mr. Tom Misiak, Sundstrand Tublar Products
Mr. Curtis Ogg, Jefferson City Regional Office

MMTL
Analytical Services

Columbia, MO 65201
314/874-8080

114 East Elm, Suite 3
O'Fallon, MO 63366
314/281-2858

AUG 22 1984

Client: Camdenton, City of
PO Box 399
Camdenton MO 65020

Date Reported: 08/14/84
Date Sampled: 07/19/84
Date Received: 07/20/84

Attention: Bud Riley

MMTL Report No: 17692

Customer P. O. Number:

MMTL Account No: 10238

## REPORT OF ANALYSIS

| Sample No. | Units | Results |
|---|---|---|
| #2 | | |
| Residue, Total Suspended | MG/L | 95 |
| Total Chromium | MG/L | .5 |
| Chromium, Hexavalent | MG/L | .20 |
| Total Copper | MG/L | 4.1 |
| Total Zinc | MG/L | .23 |
| Haloethers | | * |
| Toluene | UG/L | < 10 |
| [illegible] | UG/L | 500 |
| Grease & Oil, gravimetric | MG/L | 6 |

Comments: *See Attached Table

Approved by: _______________

Page No. 1

Report Number 17692-1    sample from lagoon    AUG 22 1984

| Name | Sample Concentration ug/L |
|---|---|
| Bis(2-chloroispropyl) ether | 29 |
| Bis(2-chloroethyl) ether | 250 |
| Bis(2-chloroethoxy) methane | 320 |
| 4-Chlorophenyl phenyl ether | <5 |
| 4-Bromophenyl phenyl ether | <5 |

Columbia, MO 65201
314/874-8080

114 East Elm, Suite 3
O'Fallon, MO 63366
314/281-2858

# MMTL Analytical Services

To: Jim Jackson
Sunstrand effluent

Client: Sunstrand Tubular Products, Inc.
PO Box 636, Sunset Drive
Camdenton MO 65020

Attention: Don Mans

Customer P. O. Number:

Date Reported: 08/14/84
Date Sampled: 07/19/84
Date Received: 07/20/84

MMTL Report No.: [illegible]

MMTL Account No.: 1010[illegible]

## REPORT OF ANALYSIS

| Sample No. | Units | Results |
|---|---|---|
| #4 | | |
| Residue, Total Suspended | MG/L | 320 |
| Total Chromium | MG/L | 7.6 |
| Chromium, Hexavalent | MG/L | < .02 |
| Total Copper | MG/L | 29 |
| Total Zinc | MG/L | 1.4 |
| Halomethers | | * |
| Toluene | UG/L | < 1000 |
| Trichloroethylene | UG/L | 4900 |
| Grease & Oil, gravimetric | MG/L | 1400 |

Comments: *See Attached Table

Approved by: ____________________

1,100 - Camdenton
PT

Former Hulett Lagoon Site
Combined PA/SI
Reference 23

*City of Camdenton...*

112 Court Circle P.O. Box 399
Camdenton, Mo. 65020
314 - 346 - 3600

May 27, 1986

Ms. Leora M. Reising
Environmental Specialist
Department of Natural Resources
Jefferson City Regional Office
1001A Southwest Boulevard
P.O. Box 176
Jefferson City, Missouri 65102

Dear Ms. Reising:

As you are aware, the City of Camdenton has one (1) industry and it is the only industry involved in pretreatment.

With joint efforts between Sundstrand and the City of Camdenton, a CDBG Grant was obtained from the state to construct the retreatment plant for Sundstrand.

The plant has been completed and has been on the line since April 14, 1986. With the exception of some minor start-up problems, the plant appears to be functioning properly. Sundstrand will furnish the City data as it pertains to their testing which will be forwarded to you and your department.

If you have any questions, please feel free to contact me or Trudy Marco.

Sincerely,

Donald Roger Elder
City Administrator

DRE/bc

cc: Mayor Kelsey
Trudy Marco, Grant Coordinator

IDG-011 - Camdenton

Permit Number 2263

Former Hulett Lagoon Site
Combined PA/SI
Reference 24

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESO

MISSOURI CLEAN WATER COMMISSION

1.110 Camdenton

# CONSTRUCTION PERMIT

The Missouri Department of Natural Resources hereby issues a permit to: City of Camdenton
112 Court Circle
P.O. Box 399
Camdenton, MO 65020

**for the construction of (describe facilities):**

SEE ATTACHED SHEET

**Permit Conditions:**

---

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 204, RSMo, and regulations promulgated thereunder, or this permit may be revoked by the Department of Natural Resources.

As the Department of Natural Resources does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.

A representative of the Department may inspect the work covered by this permit periodically during construction. Issuance of an operating permit by the Department will be contingent on the work substantially adhering to the approved plans and specifications.

This permit applies only to the construction of wastewater treatment facilities; it does not apply to other environmentally regulated areas.

September 23, 1986
Effective Date

Frederick A. Brunner, Ph.D.
Director, Department of Natural Resources

March 23, 1988
Termination Date

Director of Staff, Clean Water Commission

Filing Fee Paid

WQP 3.34

# CONSTRUCTION PERMIT

SEWERS AND FORCE MAINS: 4,625 lineal feet of 8 inch diameter sewer pipe and 2,367 lineal feet of 6 inch diameter force main as shown on the approved plans.

LIFT STATIONS: A packaged dry well lift station with two pairs of pumps. Each pair of pumps will be capable of discharging at a rate of 175 gpm at a total dynamic head of 185 feet.

These facilities are designed to eliminate the existing factory lagoon, NPDES #MO-0048577, and transport the wastes from the new Sunstrand Expansion to the C.P. White sewage collection system.

Discharge is to be into the C.P. White Lagoon, NPDES # MO-0048569.

Former Hulett Lagoon Site
Combined PA/SI
Reference 25

MISSOURI DEPARTMENT OF NATURAL RESOUI
DIVISION OF ENVIRONMENTAL QUALITY
LABORATORY SERVICES PROGRAM

DEC 15 1987

Pretreatment Monitoring Report
Sundstrand Tubular Products, Inc.
Camden County, Missouri
April 30, 1987

## INTRODUCTION

At the request of the Water Pollution Control Program a pretreatment monitoring survey was conducted of the industrial wastewater discharge of the Sundstrand Tubular Products factory in Camden County, Missouri. Sampling was conducted from 1500 through 1530 on April 30, 1987 by Lon O'Bannon, III of the Laboratory Services Program, Division of Environmental Quality.

## METHODS

A grab sample (87-1111) was collected of the effluent from the treatment system discharge weir.

All analyses were performed by the Division's Laboratory in Jefferson City. All analyses were conducted in accordance with methods outlined in the Missouri Clean Water Commission Effluent Regulation (10 CSR 20-7.015).

## OBSERVATIONS

The sample was light yellow-green and nearly clear.

## RESULTS

See the attached analytical results.

Submitted by Lon O'Bannon III
Lon O'Bannon, III
Water Quality Specialist
Field Services Section
Laboratory Services Program

Date December 7, 1987

Approved by James H. Long
James H. Long
Director
Laboratory Services Program

cc: Richard Kuntz, Permits Section, Water Pollution Control Program
Bill Kesler, Regional Administrator, Jefferson City Regional Office

LABORATORY SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No. 87-1111

Reported to: LON O'BANNON III
Affiliation: WQM

Date: 12/01/87
Project Code: 3211/3222

Sample Description:
SUNDSTRAND TUBULAR PRODUCTS, INC. - CAMDEN CO.
PRETREATMENT MONITORING.
GRAB FROM TREATMENT SYSTEM DISCHARGE WEIR TANK

Collected by: LON O'BANNON III
Affiliation: WQM

Date: 04/30/87

| PARAMETERS | RESULTS |
|---|---|
| CYANIDE | <0.05 mg/L |
| TOTAL SILVER | <1 ug/L |
| TOTAL CADMIUM | <2 ug/L |
| TOTAL CHROMIUM | 2,700 ug/L |
| TOTAL COPPER | 890 ug/L |
| TOTAL HEX. CHROMIUM | 180 ug/L |

Sample no. 87-1111
Date 12/01/87

| PARAMETERS | RESULTS |
|---|---|
| TOTAL NICKEL | 50 ug/L |
| TOTAL LEAD | <5 ug/L |
| TOTAL ZINC | 110 ug/L |

VOA RESULT : NO RESULT
COMMENTS: ANALYTICAL ERROR

Former Hulett Lagoon Site
Combined PA/SI
Reference 26

Missouri Engineering Corporation
ENGINEERING CONSULTANTS
P.O. BOX 13
ROLLA, MISSOURI 65401 • PHONE: 314-364-4003

April 25, 1988

APR 26 1988

Dave Friese
Department of Natural Resources
Water Pollution Control Program
P. O. Box 176
Jefferson City, MO 65102

Dear Dave:

You will find enclosed a copy of the sludge analysis report on the sludge from the abandoned Hulett Lagoon in Camdenton, Missouri. I have calculated the amount of dry sludge, based on an average of 9" thickness, at approximately 1250 cubic yards. 9375 gallons

The soil available in the berms to be mixed with the sludge if left on site would be approximately 2000 cubic yards.

I am also sending a copy of this letter to Ken Arnold. Would you both please review the data and let me know what the next step can be?

Sincerely,

MISSOURI ENGINEERING CORP.

Charles Ray

Charles Ray
CR/lc
Enc.
cc: Mayor Webster, Camdenton
Ken Arnold

Mike Phillip
Susan Ranard

ENVIRODYNE
ENGINEERS

12161 Lackland Road
St. Louis, Missouri 63146
(314) 434-6960

# REPORT OF ANALYSIS

CLIENT: Valda Mahoney
Missouri Engineering
Post Office Box 13
Rolla, MO 65401

REPORT DATE: April 19, 1988
SAMPLE ANALYZED: Ten sludge samples for metals analysis.

DATE RECEIVED: March 7,1988

PROJ. #: 3222-00353
P.O. #:

| Parameter | # 1 | # 2 | # 3 | # 4 | # 5 | # 6 | # 7 |
|---|---|---|---|---|---|---|---|
| Aluminum (MG/L) | 55700 | 67400 | 97000 | 89300 | 79200 | 47100 | 52000 |
| Chromium (MG/L) | 12400 | 24300 | 28900 | 19000 | 24300 | 12300 | 15600 |
| Cadmium (MG/L) | < 26.0 | < 25.4 | < 35.7 | < 13.3 | < 26.0 | < 23.2 | < 27.8 |
| Copper (MG/L) | 28800 | 24300 | 15100 | 52400 | 22600 | 34900 | 18700 |
| Lead (MG/L)* | <101 | < 99.1 | <139 | 150 | < 101 | 146 | 153 |
| Nickel (MG/L) | 91.0 | 119 | 179 | 215 | 110 | 85.9 | 89.0 |
| Zinc (MG/L) | 4910 | 4170 | 4330 | 5760 | 3810 | 4910 | 3710 |
| | 9.02 | 9.04 | 5.92 | 15.78 | 8.32 | 9.81 | 7.83 |

| Parameter | # 8 | # 9 | # 10 |
|---|---|---|---|
| Aluminum (MG/L) | 53200 | 55100 | 51200 |
| Chromium (MG/L) | 11400 | 6430 | 15900 |
| Cadmium (MG/L) | < 9.90 | < 22.8 | < 18.2 |
| Copper (MG/L) | 4540 | 13200 | 30100 |
| Lead (MG/L) | 113 | 155 | 125 |
| Nickel (MG/L) | 48.5 | 77.4 | 111 |
| Zinc (MG/L) | 2920 | 3470 | 3620 |
| | 25.09 | 9.88 | 13.89 |

All results have been corrected for percent solids.
*All concentrations have been corrected for Aluminum interference.
See reverse side for "STANDARD CLAUSES".

ppm 1 gram put in 100 mls of water = volume

/disk 25

APPROVED: Lisa A. Leeky

Former Hulett Lagoon Site
Combined PA/SI
Reference 27

JOHN ASHCROFT
Governor

FREDERICK A. BRUNNER
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176
Jefferson City, MO 65102

May 26, 1988

The Honorable Mac Webster
Mayor of Camdenton
112 Court Circle, P.O. Box 1048
Camdenton, MO 65020

Re: IDG - 011 Camdenton, MO
Lagoon Closure

Dear Mayor Webster:

This letter is to explain what options are available for the City to pursue in order to completely abandon and close the Huelett or Factory Lagoon. We have reviewed the sludge sample analysis which your engineer sent to us on April 25, 1988 and May 20, 1988. The first step before you assess each option is to determine the percent moisture and the sludge depth at each sample site and to use the information to calculate the total weight of each of the various metals.

There are several options available to the City which are briefly explained below.

Option 1

Dispose of the sludge on site, at the lagoon. This option will require the preparation of a solid waste disposal area permit application complete with plans and specifications. The Waste Management Program would then review the application to determine if it could issue the permit. A point of contact for additional information and the time requirements of this option would be Mr. Tom Gredell at 751-3176.

Option 2

Haul sludge to a permitted, sanitary landfill. This would require a Special Waste Disposal Request. The sludge must also have no "free liquid" in order to be properly handled. A copy of the special waste disposal request form is enclosed. Tom Gredell would be your contact person as in option #1.

Option 3

Surface application in accordance with the Missouri Sludge Guide, "Agricultural Use of Municipal Wastewater Sludge" (Table 4).

This would require the preparation and approval of a sludge management plan. The plan would limit the rate at which sludge could by applied. The rate would be based upon limiting the weight of metals to be applied to allow the unrestricted use of the land in the future. You should contact Ken Arnold at 751-6624 for additional information.

Option 4

Sub-surface application at the maximum one time rate. This would require either injecting the liquid sludge with chisel plows under the soil surface, or spreading the sludge, discing and then plowing the field. The rate of application would be higher than in option #3, but could not exceed the maximum cumulative site loadings per the Sludge Guide. This option would require the site to be City owned and the site would be restricted for use as a sludge disposal site in the future. Ken Arnold would be your contact person as in option #3.

Please note that what ever option is used, the lagoon must not discharge to the creek unless the City receives a new operating permit. The lagoon currently doesn't have a discharge permit. Preferably, any discharge would be to the City's sewer and be tested for compliance with the City's pretreatment ordinances before being introduced to the sewer.

We suggest you work closely with your engineer to quickly resolve the fate of the sludge disposal and lagoon abandonment. Please note the grant cannot be closed and final reimbursement made until this work is complete. If you should have any questions, please do not hesitate to call me at 751-6619.

Sincerely,

WATER POLLUTION CONTROL PROGRAM

Dave Freise

David Freise, P.E.
Project Engineer

DF/pa

cc: Jefferson City Regional Office
Missouri Engineering Corporation

Former Hulett Lagoon Site
Combined PA/SI
Reference 28

JOHN ASHCROFT
Governor

G. TRACY MEHAN III
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176
Jefferson City, MO 65102

November 2, 1989

The Honorable Mac Webster
Mayor of Camdenton
112 Court Circle, P.O. Box 1048
Camdenton, MO 65020

Re: IDG-011 Huelett Lagoon

Dear Mayor Webster:

I recently visited the above referenced lagoon site and the temporary sludge storage site at the city airport. During my visit, I noted a berm was not yet in place around the temporary storage to prevent solids run off. This is a condition of the approval issued February 22, 1989. The city administrator, Kent Hixson, stated the berm would be in place as soon as possible.

I would also like to remind you the approval is valid for only one year. Therefore, the sludge spreading must be completed in accordance with the plan and approval letter by February 22, 1990.

Thank you for your consideration in these matters and please thank Kent Hixson for me for the time he spent with me that day.

Sincerely,

WATER POLLUTION CONTROL PROGRAM

Dave Freise

David Freise, P.E.
Project Engineer

DF:mle

cc: Jefferson City Regional Office
City Administrator, Kent Hixson
Missouri Engineering Corporation

Former Hulett Lagoon Site
Combined PA/SI
Reference 29

SPECIFICATIONS

AND

CONTRACT DOCUMENTS

REMOVAL AND STOCKPILING OF

SLUDGE FROM THE HULETT LAGOON

CAMDENTON, MISSOURI

JERRY LYNN

E-10633

March, 1989

MISSOURI ENGINEERING CORPORATION
211 HWY. 63 SOUTH
ROLLA, MISSOURI

TABLE OF CONTENTS

*Missouri Engineering Corporation*
**ENGINEERING CONSULTANTS**
P O BOX 13
ROLLA, MISSOURI 65401 • PHONE 314-364-4003

April 18, 1989

REMOVAL AND STOCKPILING OF
SLUDGE FROM THE HULETT LAGOON
CAMDENTON, MISSOURI

ADDENDUM NO. 1

This project to be bid May 2, 1989, at 1:30 p.m.

Item No. 1. Bidders are hereby notified of a pre-bid conference at City Hall, Camdenton, Missouri, at 1:00 p.m., April 26, 1989.

MISSOURI ENGINEERING CORPORATION

Charles Ray

Received By:

Ronald A McCormick

5/22/89
Date

## INFORMATION FOR BIDDERS

BIDS will be received by City of Camdenton, Missouri

(herein called the "OWNER"), at City Hall, Camdenton, Missouri

until 1:30 PM, May 2, , 19 89 , and then at said office

publicly opened and read aloud.

Each BID must be submitted in a sealed envelope, addressed to City Clerk, City Hall, at Camdenton, MO 65020. Each sealed envelope containing a BID must be plainly marked on the outside as BID for Removal and Stockpiling of Sludge from the Hulett Lagoon and the envelope should bear on the outside the BIDDER's name, address and license number if applicable, and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at City Hall, Camdenton, Missouri.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or type written, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required. Tied bids will not be considered by the OWNER.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within 90 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the BID schedule by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done.

The OWNER shall provide to BIDDERS prior to BIDDING, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

ADVERTISEMENT FOR BIDS

CITY OF CAMDENTON, MISSOURI
(Owner)

Separate sealed bids for Camdenton Sludge for Removal and Stockpiling of Sludge from the Hulett Lagoon will be received by Brenda Colter, City Clerk at the office of City Hall, Camdenton, Missouri 65020 until 1:30 o'clock (~~A.M.~~ - P.M., ____ S.T. X D.S.T.) May 2, 1989, and then at said office publicly opened and read aloud.

The Information for Bidders, Form of Bid, Form of Contract, Plans, Specifications, and Forms of Bid Bond, Performance and Payment Bond, and other contract documents may be examined at the following:

City Hall, Camdenton, Missouri 65020

Missouri Engineering Corporation

211 Hwy. 63 South, Rolla, MO 65401

Copies may be obtained at the office of Missouri Engineering Corporation located at 211 Hwy. 63 South, Rolla, MO 65401 upon payment of $ 10.00 for each set. Any plan holder, upon returning such set promptly and in good condition, will be refunded $ -0-.

The owner reserves the right to waive any informalities or to reject any or all bids.

Each bidder must deposit with his bid, security in the amount, form and subject to the conditions provided in the Information for Bidders.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and and minimum wage rates to be paid under the contract, Section 3, Segregated Facility, Section 109 and E.O. 11246.

No bidder may withdraw his bid within 30 days after the actual date of the opening thereof.

______________________ ______________________
Date

The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve the contractor from fulfilling any of the conditions of the contract.

Each BID must be accompanied by a BID bond payable to the OWNER for five percent of the total amount of the BID. As soon as the BID prices have been compared, the OWNER will return the BONDS of all except the three lowest responsible BIDDERS. When the Agreement is executed the bonds of the two remaining unsuccessful BIDDERS will be returned. The BID BOND of the successful BIDDER will be retained until the payment BOND and performance BOND have been executed and approved, after which it will be returned. A certified check may be used in lieu of a BID BOND.

A performance BOND and a payment BOND each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the OWNER, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign BID BONDS or payment BONDS and performance BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the performance BOND and payment BOND within fifteen (15) calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary Agreement and BOND forms. In case of failure of the BIDDER to execute the Agreement, the OWNER may consider the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the property of the OWNER. Upon default by the first low BIDDER the AWARD may then be made to the next lowest responsible BIDDER, or the WORK may be readvertised for a construction CONTRACT or otherwise, as the OWNER may decide.

The OWNER upon receipt of an acceptable performance BOND, payment BOND, Certificate of Insurance, and AGREEMENT signed by the party to whom the AGREEMENT was awarded, shall within a reasonable period of time sign the AGREEMENT and return to such party an executed duplicate of the AGREEMENT. The OWNER upon signing the AGREEMENT and within a reasonable period of time shall issue the NOTICE TO PROCEED.

The OWNER may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID

if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the Agreement and to complete the WORK contemplated therein.

A conditional or qualified BID will not be accepted.

Award will be made to the lowest responsive, responsible BIDDER, based on the total base bid for the work described in the proposal form.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause set forth in the SUPPLEMENTAL GENERAL CONDITIONS.

The low BIDDER shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when required to do so by the OWNER.

The A/E is Missouri Engineering Corporation. The A/E's address is 211 South Highway 63 South, Rolla, Missouri 65401.

The Bidder agrees by the submission of his bid that he will not discriminate against any employee or applicant for employment because of race, creed, color, national origin, or sex in connection with the performance of work under this bid and/or contract.

## PROPOSAL FORM

TO: City Council
Camdenton, Missouri

The UNDERSIGNED BIDDER, having examined the plans, specifications, general and special conditions and other proposed contract documents attached hereto and referred to herein, and any and all addenda thereto; the location, arrangement, and construction of existing railways, streets, roads, structures and facilities which affect or may be affected by the proposed work, the topography and condition of the site of the work, and having acquainted with and fully understanding (a) the extent and character of the work covered by this Proposal; (b) the location, arrangement and specified requirements of and for the proposed new structures and miscellaneous items or work appurtenant thereto; (c) the nature and extent of the excavations to be made and the type, character, and general condition of the materials to be excavated; (d) the necessary handling and rehandling of excavated materials; (e) all existing and local conditions relative to construction difficulties and hazards, labor, transportation, hauling, trucking, and rail delivery facilities; and (f) all other factors and conditions affecting or which may be affected by the specified work.

HEREBY PROPOSES to furnish all required materials, supplies, equipment, tools, and plant; to perform all necessary labor; and to construct, install, erect, and complete all work stipulated in, required by, and in accordance with, the proposed contract documents hereto attached and the plans and other documents referred to therein (as altered, amended, or modified by and all addenda thereto) at the prices stated below.

Bidder hereby agrees to commence work under this contract on or before date to be specified in written "Notice to Proceed" of the Owner and to fully complete the project within: 60 Consecutive Calendar Days

Removal and Stockpiling of Sludge from the Hulett Lagoon

Bidder further agrees to pay as liquidated damages the sum of $100.00 for each consecutive calendar-day thereafter as hereinafter provided in the General Conditions.

Bidder agrees to perfrom all the work as described in the specifications and as shown on the plans for the following prices.

REMOVAL AND STOCKPILING FROM THE HULETT LAGOON

| Item No. | Description | Estimated Quantity | Unit Price | Extension |
|---|---|---|---|---|
| 1. | Lagoon Dewatering by Pumping | 50 Hrs. | $ 36.50 | $ 1,825.00 |
| 2. | Lime added to Sludge, Complete | 100 Tons | $ 14.60 | $ 1,460.00 |
| 3. | Discing of Sludge | 40 Hrs. | $ 43.25 | $ 1,730.00 |
| 4. | Sludge Removal from Lagoon and Stockpiling, Complete | 1500 Cu Yds | $ 7.73 | $ 11,595.00 |
| 5. | Site Work at Stockpile Site | L.S. | $ | 2,920.00 |
| | | TOTAL | $ | 19,530.00 |

Listed above is the revised proposal form including unit prices and then extensions. This proposal form was revised due to excluding unit prices in the original bid; however the total remains the same. I agree to the above unit prices, extensions and total and agree to perform the work described above for these prices.

Ronald A. McCormick

Ronald A. McCormick, Owner
McCormick Gravel & Excavating

5/6/89
Date

It is mutually understood and agreed by and between the parties of this contract, in signing the agreement thereof, that time is of the essence in this contract. In the event that the Contractor shall fail in the performance of the work specified and required to be performed within the period of time stipulated therefor in the Contract Agreement binding said parties after due allowance for any extension of time which may be granted under provisions of the preceding paragraph, the Contractor shall pay unto the Owner, as stipulated liquidated damages and not as a penalty the sum stipulated therefor in the Proposal, for each and every calendar day that the Contractor shall be in default.

Liquidated damages will be waived for any period of time covered by a time extension granted by the Owner.

In the case of joint responsibility for any delay in the final completion of the work covered by this contract, where two or more separate contracts are in force at the same time and cover work on the same project and at the same site, the total amount of liquidated damages assessed against all contractors under such contracts, for any one day of delay in the final completion of the work, will not be greater than the approximate total of the damages sustained by the Owner by reason of such delay in completion of the work, and the amount assessed against any Contractor for such one day of delay will be based upon the individual responsibility of such Contractor for the aforesaid delay as determined by and in judgment of the Owner.

The Owner shall have the right to deduct said liquidated damages from any moneys in its hand, otherwise due, or to become due, to said Contractor, or to sue for and recover compensation for damages for non-performance of this contract at the time stipulated herein and provided for.

The undersigned hereby agrees to enter into contract on the attached contract forms and furnish the necessary bond and evidence that insurance of the kind and minimum limits specified is in force within ten days from the date of your acceptance of this proposal, to begin assembly of materials and equipment within ten days from receipt of executed copies of the contract and to complete said work within the indicated number of consecutive calendar days from and after the date of receipt from the Owner of a written work order.

If this proposal is accepted, and should (I) (We) for any reason fail to sign the contract within ten days, as above stipulated, the deposit which has been this day made with the Owner shall at the option of the Owner be retained by the Owner as liquidated damage for the delay and expense caused the owner but otherwise it shall be returned to the undersigned in accordance with the provisions set forth in Information for Bidders.

I have ____, have not ✓, participated in a previous contract, subject to the provisions of Section 301 of Executive Order 11246, as amended.

I have ____, have not ✓, submitted required compliance reports under such previous contracts.

DATED AT ______________________________ this 2nd day

of May, 19 89.

SIGNATURE:

If an individual: Ronald A McCormick doing business as

McCormick Gravel + Excavating

If a Partnership: ______________________________

By ______________________________ Member of the Firm

If a Corporation: ______________________________

By ______________________________

Title ______________________________

ATTEST: ______________________________
Secretary

(CORPORATE SEAL)

Business Address of Bidder RR 2 Box 193 E

Versailles, Mo 65084

If Bidder is a corporation, supply the following information:

State in which incorporated ______________________________

Name and Address of its:

President ______________________________

______________________________

Secretary ______________________________

______________________________

## BIDDERS QUALIFICATIONS & SUBCONTRACTING

To evaluate the bidders' qualifications for acceptance on this project, the Owner requests the following:

a. Previous Experience (Projects of similar construction detail)

| Location | Year | Type | Mat'l Type & Size | Approx. Bid |
|---|---|---|---|---|
| Lake of the Ozarks | 1989 | Dredging | 5500 yd. mud + gravel 6" + under | $6500 |
| Lake of the Ozarks | 1989 | Dredging | 1500 yd mud + gravel 6" + under | $2500 |
| Lake of the Ozarks | 1989 | Dredging | 1500 yd mud + gravel 6" + under | $2500 |
| Laurie, Mo | 1989 | construct pond | 50 yd. X 100 yd. X 6 ft. dirt + rock | $5000 |

b. List of Equipment available for this job:

John Deere 690B Excavator

Caterpillar 955H Dozer/Loader

2 Dump Trucks (Tandem) John Deere tractor

500 gal water wagon with pump, 2' pump - Disc

c. List of subcontractors contemplated for this job:

| (Name) | (Type of Work) |
|---|---|
| Carl Miller | Dump truck |
| | |
| | |
| | |

This report is an integral part of the proposal.

Date 5/2, 19 89

By Ronald 9 [illegible]

Title Owner

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, ______________________________, the duly
(Print)

authorized and acting legal representative of ____________________

________________________, do hereby certify as follows:

I have examined the foregoing contract(s) of ____________________
(Contractor)

__________________________ and surety bonds and the manner of

execution thereof, and I am of the opinion that each of the aforesaid agreements have been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof. In addition, I have examined the Certificate of Insurance for amounts and coverages per the requirements of the General Conditions/Supplemental General Conditions of the contract documents and find that adequate insurance is in full force and effect.

David T Welch
Project Attorney

6/5/89
Date

Address:

AGREEMENT

THIS AGREEMENT, made this 6TH day of June, 1989,

by and between City of Camdenton, Missouri, hereinafter called
(name of Owner), (~~an individual~~)

and McCormick Gravel & Excavating doing business as (an individual), or (a ~~partnership~~), or (a ~~corporation~~) hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements herein after mentioned:

1. The CONTRACTOR will commence and complete the construction of REMOVAL & STOCKPILING FROM THE HULETT LAGOON.

2. The CONTRACTOR will furnish all of the materials, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the PROJECT described herein.

3. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within 3 calendar days after the date of the NOTICE TO PROCEED and will complete the same within 60 calendar days unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS.

4. The CONTRACTOR agrees to perform all of the WORK described in the CONTRACT DOCUMENTS and comply with the terms therein for the sum of Nineteen thousand five hundred thirty and 00/100 Dollars $ 19,530.00.

5. The term "CONTRACT DOCUMENTS" Means and includes the following:

(A) Advertisement for BIDS

(B) Information for BIDDERS

(C) BID

(D) BID BOND

(E) Agreement

(F) General Conditions

(G) SUPPLEMENTAL GENERAL CONDITIONS

(H) Payment BOND

(I) Performance BOND

(J) NOTICE OF AWARD

(K) NOTICE TO PROCEED

(L) CHANGE ORDER

(M) DRAWINGS prepared by ______________________________

numbered __________ through __________, and dated __________,

(N) SPECIFICATIONS prepared or issued by ____________________
Missouri Engineering Corporation ,

dated March, 19 89.

(O) ADDENDA:

No. 1, dated April 18, 19 89

__________, ______________, 19______

__________, ______________, 19______

__________, ______________, 19______

__________, ______________, 19______

__________, ______________, 19______

6. The OWNER will pay to the CONTRACTOR in the manner at such times as set forth in the General Conditions such amounts as required by the CONTRACT DOCUMENTS.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in ( 4 ) copies each of which shall be deemed an original on the date first above written.

OWNER:

CITY OF CAMDENTON, MISSOURI

By Mac Webster

Name Mac Webster
(Please Type)

Title Mayor

(SEAL)

ATTEST:

Brenda Colter

Name Brenda Colter
(Please Type)

Title City Clerk

CONTRACTOR:

McCORMICK GRAVEL & EXCAVATING

By Ronald A. McCormick

Name Ronald A. McCormick
(Please Type)

Address R. R. 2, Box 193E

Versailles, MO 65084

Employer Identification Number:

42-1311948

(SEAL)

ATTEST:

✓ Danny L. Grupe

Name Danny L. Grupe
(Please Type)

expires 4-14-90

## TECHNICAL SPECIFICATIONS

## GENERAL

The Contractor shall provide the services, equipment and all appurtenances for the removal and stockpiling of the existing wastewater sludge located within the Hulett Lagoon. This lagoon has been eliminated as a part of the city's sewer system with construction of new sewer lines. The lagoon's primary contributor was a metal tubing company and hence, the metals content in the sludge accumulated in the lagoon is of a higher than normal concentration. Test results of samples taken of the sludge are given as an appendix to this report. The locations of the lagoon and the stockpiling area are also given in the appendices. The contractor's responsibility will be to stockpile the sludge at the site provided in accordance with the following specifications.

1. LAGOON DEWATERING: The Contractor shall pump the existing water from the lagoon and discharge it into the existing sewer manhole approximately 100 feet away, see Appendix I. The Contractor shall make all provisions as provided to prevent any solids to be discharged into the sewer system. The lagoon presently has 6" to 12" of water standing in the bottom with the sludge. The contractor shall dewater the sludge to at least a condition where the sludge will cake. The expected solids content is 12 to 15 percent. The contractor will be allowed to construct a sump pit in one of the lower parts of the lagoon. This pit must be of seal tight construction such as metal or fiberglass. This sump can be placed in an area where the sludge has been removed and down to an elevation of approximately 18" depth. The upper portion of the sump shall be provided with screens having      mesh wire to prevent

solids easy access to the sump. When the sump has been placed the outer edges shall be backfilled and sealed so as to prevent leakage around the sump box. This will be done by compacting the soil backfill into the excavated areas. The contractor shall be paid for this work at an hourly rate while the pump is in operation. The pump or pumps used shall not exceed a total of 200 GPM into the sewer system. The contractor has sole responsibility for insuring that the dewatering is directly pumped into the sewer line.

2. SLUDGE REMOVAL & STOCKPILING:

A. PREPARATION

The Contractor shall remove as much of the concentrated sludge from the cell as possible without excavating into the soils of the floor. This may be accomplished with a high lift or other piece of equipment as selected by the contractor. If the sludge is not suitable for removal using these methods, after dewatering and normal evaporation, the contractor may add lime and/or disc the sludge to assist in the drying. The proposal form provides for unit costs for these items but will not be paid for unless prior approval is obtained from the city.

After the contractor has removed as much of the sludge as possible from the cell bottom, then upon approval of the Engineers, a pit may be excavated to allow for collection of the remaining sludge. This will only be allowed in an area where tests can be performed to insure proper soils conditions will prevent seepage.

B. TRANSPORTATION

The Contractor shall load the sludge into a truck capable of a liquid tight performance. A rubber seal, gasket, or sealant material between the tailgate and the bed and a bed cover shall be required to pervent leakage of sludge materials from the truck while in transit to the stockpile location. All trucks shall be inspected prior to leaving the site to insure that seepage is not occuring. The contractor is totally responsible for cleaning up any seepage or spills that occur in any area between the two sites.

The Contractor shall provide a water tank or other means, at the stockpile site, to allow the trucks to be cleaned on the exterior of the bed, should accumulation cause for spillage on the return trips.

C. STOCKPILING

The stockpiling site is located approximately 150 linear feet from the county road. The Contractor shall provide his own access to the stockpile area at the location designated. The Contractor shall provide clearing, install culverts, crushed stone, etc. as necessary for his operations.

Before stockpiling begins, the contractor shall plow 2 furrows around the site, except for the area on the higher side, needed for truck access to the area. These furrows shall be sufficient to prevent drainage from the site. The area to be encompassed is approximately 160 feet in diameter.

The sludge shall be stockpiled to a height of no more than 2 feet.

The Contractor shall level the sludge after is is dumped from the trucks as necessary so as to normally maintain this height of less than 2 feet. This could be accomplished once daily.

This access road as provided by the contractor shall remain in place after the contractor's work has been completed.

BASIS OF PAYMENT OF SLUDGE REMOVAL

The sludge was checked for the thickness of the layer at varying points in the lagoon. Two piles of up to 18" thickness are located at each of the inlet pipes. The remainder of the cell is covered with sludge ranging basically in thickness from 6" to 12". The amount of sludge to be removed has been shown on the proposal form at 1500 cubic yards. Actual quantities are believed to be less. Final payment will be based on the actual amount of sludge removed and stockpiled having at least a 12% solids content. The size and number of trucks shall be recorded showing the total trips of each. This shall be used to determine the actual quantity removed. If discrepancies are encountered in the size and number of loads, then the stockpile area shall be guided as a cross check. This will all be done with a member of the construction crew present.

## SECTION 1 CALCULATIONS

I. Determination of Acreage for Sludge Disposal

A. Limitations

1. Maximum cumulative copper limit of 500 bls./acre
2. Camdenton Airport
   a. Field No. 1 25.0 acres
   b. Field No. 2 17.4 acres

B. Conversion Factors

1. 1 MG/L = 1 ppm
2. Weight of water = 62.4 lbs/cu ft
3. Weight of lagoon sludge = 1.2 x weight of water
   = (1.2) (62.4) = 74.88 lbs/cu ft

C. Information from Test Reports and References

1. Average metal analysis for ten copper samples = 24,464 MG/L

D. Calculation of Acreage Using DNR Guidelines

1. Total sludge limit of copper in dry tons/acre

a.

| Metal | ppm | | | lbs./dry ton |
|---|---|---|---|---|
| Cu | 24,464 | x | 0.002 = | 48.928 |

b.

| (1) Cumulative Metal Limits lbs./acre | (2) Sludge Metal lbs/dry ton | (3) Total Sludge Limit dry tons/acre col. 1 ÷ col. 2 |
|---|---|---|
| 500 | 48.928 | 10.219 |
| 250 | 48.928 | 5.1095 |

2. Weight of Dry Sludge

Quanity of Sludge = 1250 cu yd        % Solid of Sludge = 20%

$$\frac{(1250 \text{ cu yd}) (27 \text{ cu ft/cu yd}) (0.2) (74.88 \text{ lbs/cu ft})}{2000 \text{ lbs/ton}} = 253 \text{ Dry Tons}$$

3. Field No. 1 (25.0 acres) accepts a Cumulative Metal Limit of 500 lbs/acre. Apply 164 tons to Field No. 1. The 164 tons will be dispensed on 16.1 acres.

   Field No. 2 (17.4 acres) accepts a Cumulative Metal Limit of 250 lbs/acre. Apply 89 tons to Field No. 2. The 89 tons will be dispensed on 17.4 acres.

II. Acidity Warrents Liming of the Disposal Site

A. Limitations

1. Disposal site should have a pH value of 6.0

B. Information from Test Reports

1. Field No. 1 & 2 at the Camdenton Airport has a Enm requirement of 4330 and 2195 respectively.

2. To determine the amount of limestone needed in tons/acre divide the ENM requirement by the guarantee of the limestone dealer.

C. Procedure for obtaining pH of 6.0

1. Apply lime to disposal site before applying the sludge

2. Disc lime into field before applying the sludge

3. Have soil samples taken to verify an acquired pH of 6.0.

III. Dewatering, Storage and Disposal of Sludge

A. Limitations

1. The sludge will be transported by a dump truck with the means to protect leakage or spillage of the sludge.

B. Information from Test Reports

1. On May 16, 1988 the sludge contained an average of 11.5% soild.

C. Procedure

1. Dewatering of sludge should occur by removal of liquids and Natural evaporation. Discing and Liming sludge maybe used to assist coagulation.

2. Transport sludge by dump truck to a designated storage area at the Camdenton Airport.

3. Precautions should be taken to contain the sludge while stock-piled. A berm will be necessary around the temporary storage site at the airport to contain any run-off.

4. A Dry Sludge Applicator should be used to apply th sludge onto Field No. 1 & 2.

Note:

1. The sludge must be thoroughly mixed before being land applied due to the variability of the metals concentration throughout the lagoon as shown by the sample report dated April 19, 1988.

2. Percent solids concentrations must be run daily on the sludge when it is being applied to ensure the loading rate can be calculated as the application progresses.

3. Upon completion of the work, a summary must be submitted to the Department of Natural Resources.

## SECTION 2 REFERENCES


1. Agricultural Use of Municipal Wastewater Sludge - A Planning Guide
   Missouri Department of Natural Resources
   Division of Environmental Quality
   January 1985

2. Process Design Manual for Dewatering Municipal Wastewater Sludges
   U. S. Environmental Protection Agency
   Office of REsearch and Development Municipal Environmental Research Laboratory
   October 1982 EPA - 625/1-82-014

## Metal Limitations

See Table 4 for maximum recommended heavy metal loadings. The metals listed in Table 4 are those which are most common in domestic sludges. For other industrial contributors See Table 4-A and contact the Department for any other parameters. Calculate which is the most limiting metal and the number of years to reach the limit at the proposed application rate. A sample worksheet is provided (Appendix B-1).

ppm metal x .002 = lbs. metal per dry ton

TABLE 4
Maximum Cumulative Amounts of Heavy Metals
Recommended for Privately Owned Farmland

| Metal | kg/ha (pounds/acre in parenthesis) Soil Cation Exchange Capacity (meq/100 g soil) | | |
|---|---|---|---|
| | CEC 0 - 5 | CEC 5 - 15 | CEC 15 + |
| Cadmium | 5 (4.5) | 10 (9) | 20 (18) |
| Chromium | 560 (500) | 1120 (1000) | 2250 (2000) |
| Copper | 140 (125) | 280 (250) | 560 (500) |
| Lead | 560 (500) | 1120 (1000) | 2250 (2000) |
| Nickel | 140 (125) | 280 (250) | 560 (500) |
| Zinc | 280 (250) | 560 (500) | 1120 (1000) |

APPENDIX B-2 SLUDGE WORKSHEET - CONSERVATIVE MANAGEMENT

Facility ______________ Address ______________ Date ______________

STEP 1 - LAB DATA (see page 22)

A) SLUDGE ANALYSIS (Expressed on dry solids basis)

| | ppm | | lbs/dry ton |
|---|---|---|---|
| Total Kjeldahl Nitrogen | ____ | x .002 = | 0 |
| Cadmium (Cd) | 0 | | 0 |
| Chromium (Cr) | 17,053 | | 26.106 |
| Copper (Cu) | 24 464 | | 48.928 |
| Nickel (Ni) | 112.58 | | 0.225 |
| Zinc (Zn) | 4,161 | | 8.322 |
| Other | 64,720 | | 129 440 |
| Other Solids | ____ | ppm ÷ 10,000 = | ____ % |

B) SOIL TEST ANALYSIS (See Page 13)

pH ____ Limestone needed ______ ENM

Cation Exchange Capacity (CEC) ______ me

STEP 2 - CROP AND SITE INFORMATION (See Page 23 & 24)

Previous Crop ______________

Future Crop ______________

Slope ____ % Buffer Areas ____ Feet from ____

Geologic Restrictions ______________

Pathogen Reduction ______________

Cattle Grazing ______________

Other ______________

Location____1/4, Sec____,Twp____,Rge____, County____

STEP 3 - APPLICATION RATE

150 lbs/acre Total N ÷ ____ lbs Total N per dry ton of sludge (Step 1) = ____* dry tons/acre/year of sludge.

* For surface application the maximum rate is 2 dry tons.

STEP 4 - METALS EVALUATION

A) SLUDGE APPLICATION RATE ______ tons/acre/year from Step 2 or Step 3 or lower selected rate.

B) METALS ADDITIONS (See Page 17 & 18)

| METAL | (1) CUMULATIVE METAL LIMITS LBS/ACRE (Table 4) | (2) LBS METAL PER DRY TON SLUDGE (Step 1) | (3) TOTAL SLUDGE LIMIT DRY TONS/ACRE (Col 1 ÷ Col 2) | (4)* METALS APPLIED PER YEAR LBS/ACRE (Col 2 x Step 4A) |
|---|---|---|---|---|
| Cd | 18 | 0 | – | |
| Cr | 2000 | 26.106 | 76.611 | |
| Cu | 500 | 48.928 | 10.219 | |
| Ni | 500 | 0.225 | 2222.222 | |
| Zn | 1000 | 8.322 | 120.163 | |
| Other | | | | |

* Column 4 should not be more than 10-15 % of Column 1.

Cu Most Limiting Metal (lowest in Column 3)

10.219 Dry Tons/Acre Total Sludge Limit (lowest Column 3)

C) SITE LIFE FOR METALS LOADING

______ Dry Tons/Acre Total Sludge Limit (Step 4B)

\- ______ Dry Tons/Acre Sludge Applied Previously

= ______ Dry Tons/Acre Sludge Remaining to Reach Metal Limit

÷ ______ Dry Tons/Acre/Year Sludge Application (Step 4A)

= ______ No. Years To Reach Metals Limits

ENVIRODYNE
ENGINEERS

12161 Lackland Road
St. Louis, Missouri [illegible]
(314) 434-69[illegible]

# REPORT OF ANALYSIS

CLIENT: Valda Mahoney
Missouri Engineering
Post Office Box 13
Rolla, MO 65401

REPORT DATE: April 19, 1988
SAMPLE ANALYZED: Ten sludge samples for metals analysis.

DATE RECEIVED: March 7,1988
P.O. #:

PROJ. #: 3222-00353

| Parameter | # 1 | # 2 | # 3 | # 4 | # 5 | # 6 | # 7 |
|---|---|---|---|---|---|---|---|
| Aluminum (MG/L) | 55700 | 67400 | 97000 | 89300 | 79200 | 47100 | 52000 |
| Chromium (MG/L) | 12400 | 24300 | 28900 | 19000 | 24300 | 12300 | 15600 |
| Cadmium (MG/L) | < 26.0 | < 25.4 | < 35.7 | < 13.3 | < 26.0 | < 23.2 | < 27.8 |
| Copper (MG/L) | 28800 | 24300 | 15100 | 52400 | 22600 | 34900 | 18700 |
| Lead (MG/L)* | <101 | < 99.1 | <139 | 150 | < 101 | 146 | 153 |
| Nickel (MG/L) | 91.0 | 119 | 179 | 215 | 110 | 85.9 | 89.0 |
| Zinc (MG/L) | 4910 | 4170 | 4330 | 5760 | 3810 | 4510 | 3710 |

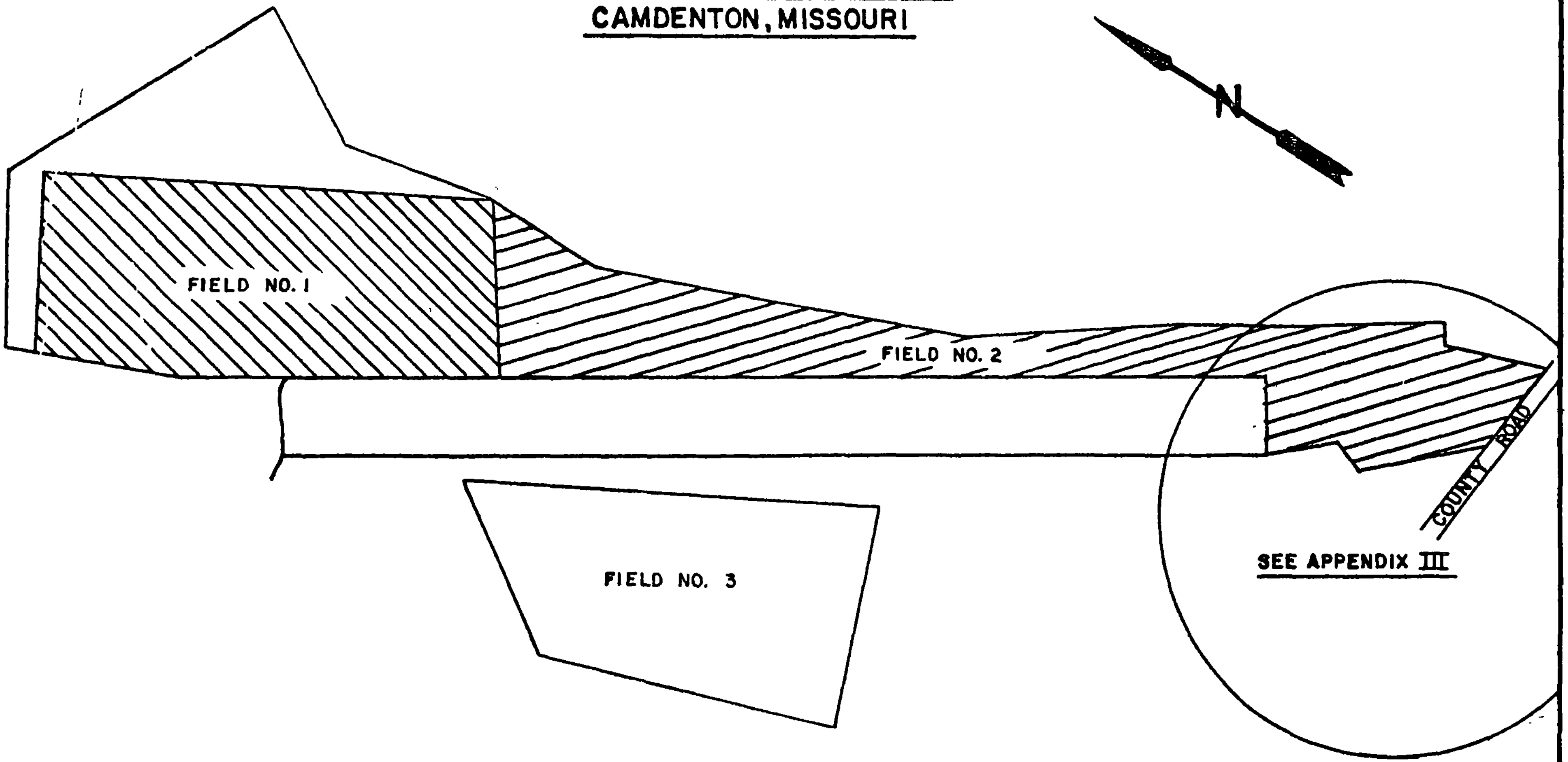
| Parameter | # 8 | # 9 | # 10 |
|---|---|---|---|
| Aluminum (MG/L) | 53200 | 55100 | 51200 |
| Chromium (MG/L) | 11400 | 6430 | 15900 |
| Cadmium (MG/L) | < 9.90 | < 22.8 | < 18.2 |
| Copper (MG/L) | 4340 | 10200 | 30100 |
| Lead (MG/L) | 113 | 155 | 125 |
| Nickel (MG/L) | 48.5 | 77.4 | 111 |
| Zinc (MG/L) | 2920 | 3470 | 3620 |

All results have been corrected for percent solids.
*All concentrations have been corrected for Aluminum interference.
See reverse side for "STANDARD CLAUSES".

/disk 25

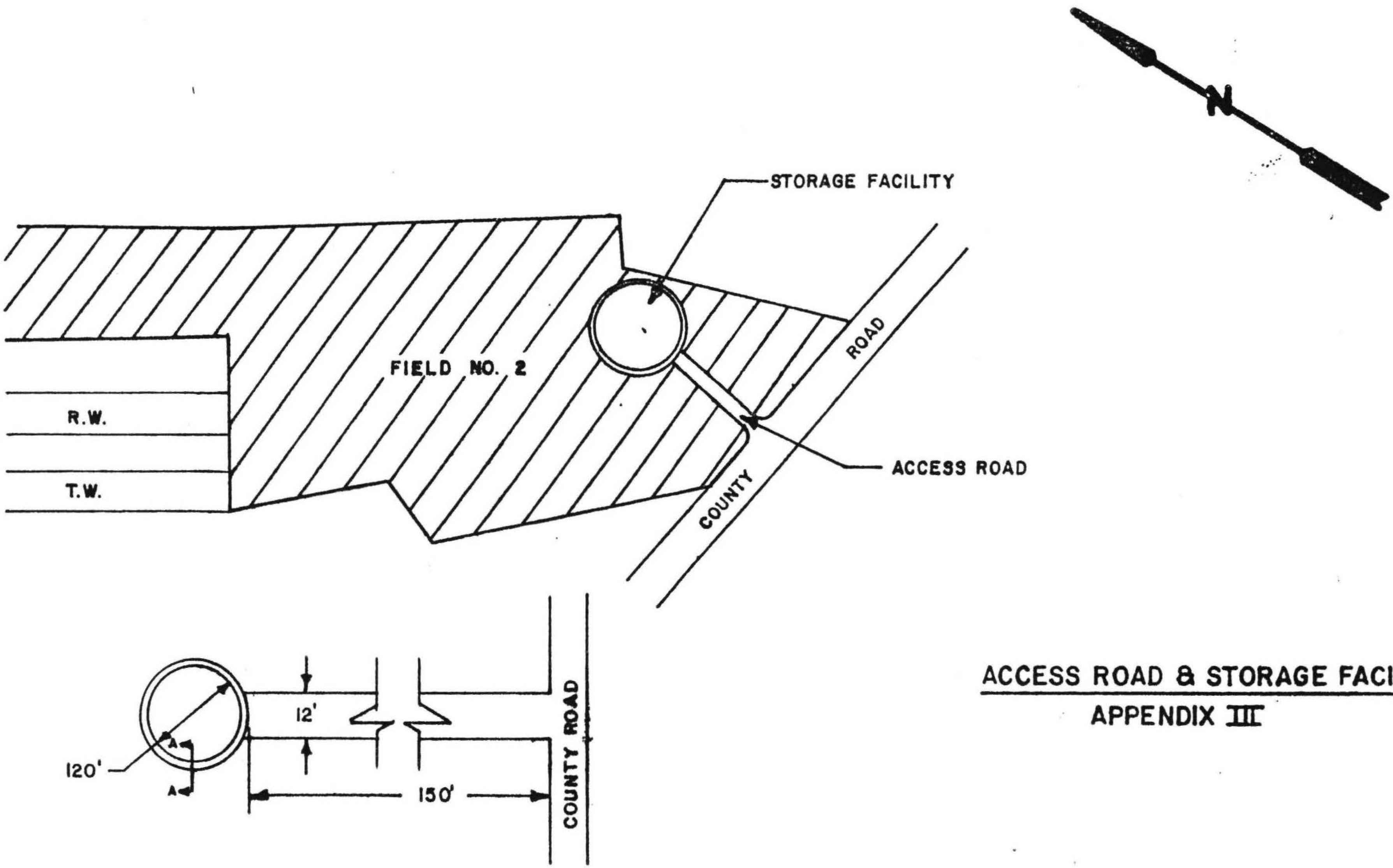
APPROVED:

## SLUDGE DISPOSAL SITES
## CAMDENTON, MISSOURI



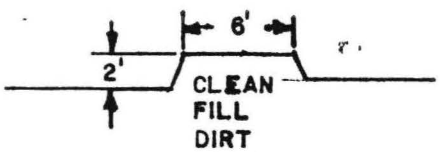

NOTE: FIELD NO. 2 AND PART OF FIELD NO 1
TO BE USED FOR DISPOSAL.

| MISSOURI ENGINEERING CORP<br>CONSULTING ENGINEERS ROLLA, MISSOURI | | |
|---|---|---|
| DRAWN BY | SCALE NONE | DRAWING NO |
| CK D BY | APP'D DATE | APPENDIX II |




# ACCESS ROAD & STORAGE FACILITY

## APPENDIX III

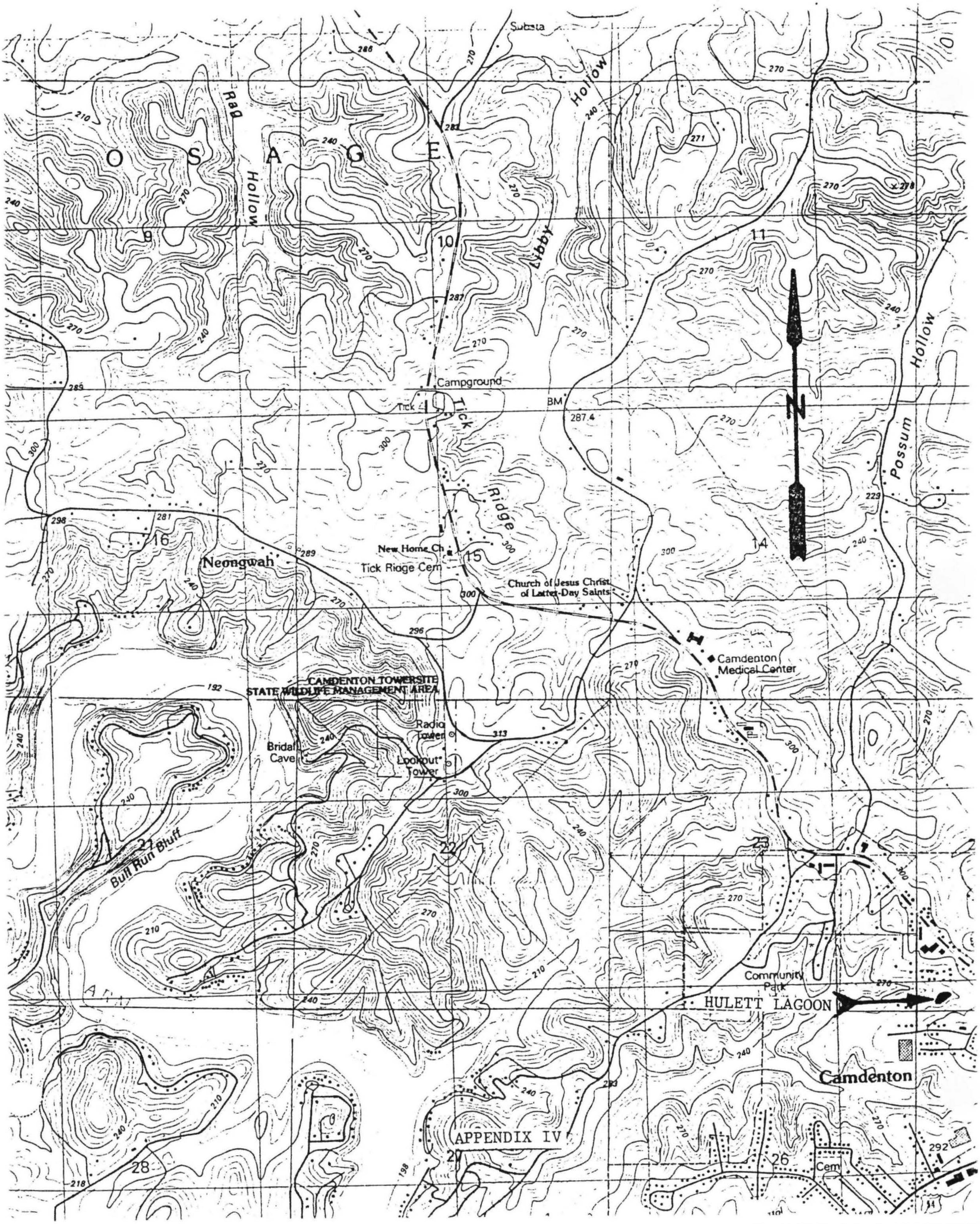



SECTION A-A

MISSOURI ENGINEERING CORP.

CONSULTING ENGINEERS ROLLA, MISSOURI

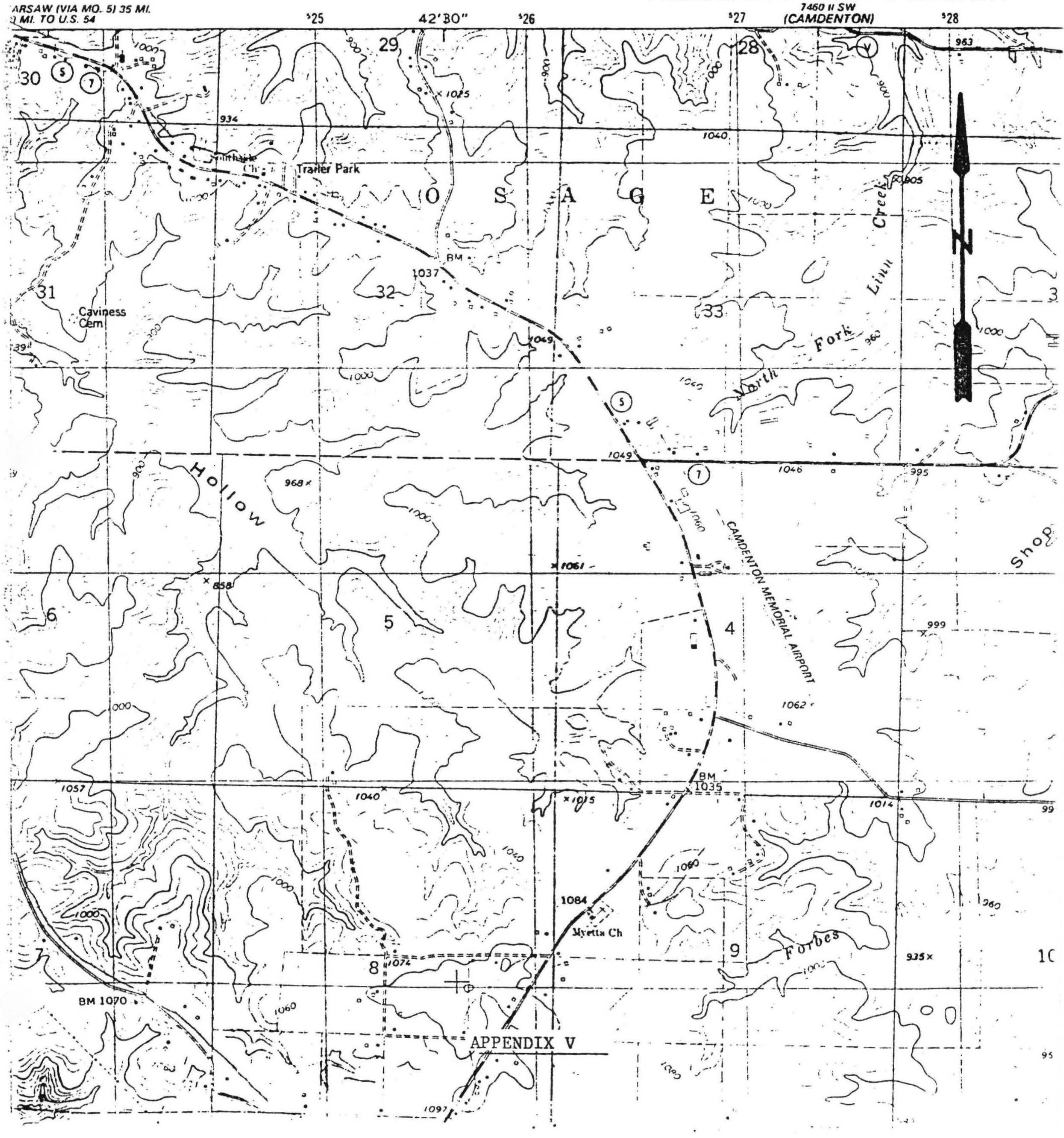
| | | |
|---|---|---|
| DRAWN BY | SCALE 1" = 200' | DRAWING NO. |
| CK'D. BY | APP'D. DATE | APPENDIX III |


O S A G E
Rag Hollow
Libby Hollow
Possum Hollow
Tick Ridge
Campground
Neongwah
New Home Ch
Tick Ridge Cem
Church of Jesus Christ of Latter-Day Saints
Camdenton Medical Center
CAMDENTON TOWERSITE STATE WILDLIFE MANAGEMENT AREA
Radio Tower
Lookout Tower
Bridal Cave
Bull Run Bluff
Community Park
HULETT LAGOON
Camdenton
Cem
N
BM 287.4

APPENDIX IV

OR

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
WALLACE B. HOWE, STATE GEOLOGIST




APPENDIX V

ENVIRODYNE ENGINEERS

REPORT OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Valda Mahoney<br>Missouri Engineering<br>Post Office Box 13<br>Rolla, MO 65401 | REPORT DATE:<br>SAMPLE ANALYZED: | April 19, 1988<br>Ten sludge samples for metals analysis. |
| | | DATE RECEIVED: | March 7,1988 |
| PROJ. #: | 3222-00353 | P.O. #: | |

| Parameter | # 1 | # 2 | # 3 | # 4 | # 5 | # 6 | # 7 |
|---|---|---|---|---|---|---|---|
| Aluminum (MG/L) | 55700 | 67400 | 97000 | 89300 | 79200 | 47100 | 52000 |
| Chromium (MG/L) | 12400 | 24300 | 28900 | 19000 | 24300 | 12300 | 15600 |
| Cadmium (MG/L) | < 26.0 | < 25.4 | < 35.7 | < 13.3 | < 26.0 | < 23.2 | < 27.8 |
| Copper (MG/L) | 28800 | 24300 | 15100 | 52400 | 22600 | 34900 | 18700 |
| Lead (MG/L)* | <101 | < 99.1 | <139 | 150 | < 101 | 146 | 153 |
| Nickel (MG/L) | 91.0 | 119 | 179 | 215 | 110 | 85.9 | 69.0 |
| Zinc (MG/L) | 4910 | 4170 | 4330 | 5760 | 3810 | 4910 | 3710 |

| Parameter | # 8 | # 9 | # 10 |
|---|---|---|---|
| Aluminum (MG/L) | 53200 | 55100 | 51200 |
| Chromium (MG/L) | 11400 | 6430 | 15900 |
| Cadmium (MG/L) | < 9.90 | < 22.8 | < 18.2 |
| Copper (MG/L) | 4540 | 13200 | 30100 |
| Lead (MG/L) | 113 | 155 | 125 |
| Nickel (MG/L) | 48.5 | 77.4 | 111 |
| Zinc (MG/L) | 2920 | 3470 | 3620 |

All results have been corrected for percent solids.
*All concentrations have been corrected for Aluminum interference.
See reverse side for "STANDARD CLAUSES".

ppm 1gram put in 100 mls of water = volume

APPENDIX VI
Page 1

/disk 25

APPROVED: Lisa A. Lyeky

Former Hulett Lagoon Site
Combined PA/SI
Reference 30

*Missouri Engineering Corporation*
**ENGINEERING CONSULTANTS**
P O BOX 13
ROLLA, MISSOURI 65401 • PHONE 314-364-4003

July 21, 1989

SLUDGE REMOVAL PROJECT
HULETT LAGOON - CAMDENTON, MO

Mr. Ron Macormic approached me concerning the spreading of the sludge on the 22 acre area at the airport. This sludge is currently being stockpiled.

His proposal is basically as outlined below.

1. Spreading of sludge complete - $2.25 per cu. yd.
   We have estimated this at 1500 cu yc. or $3375.00.

2. Clearing, bush-hogging, or cutting to be able to utilize the area. May be up to 4 acres.
   His proposal is $400 per acre or $1600.00

3. Discing of the field after sludge application to create a mixture and seed bed.
   A lum sum cost of $560 00.

4. For seeding of the 22 acre tract with 15 lbs per acre of fescue and 1 bushel per acre of cover crop at a cost of $45.00 per acre or a total of $990.00.

Based upon our estimated quantities, this would create a change order increase of a total of $6525.00. If you wish to pursue this method of completing the disposal, please let me know.

MISSOURI ENGINEERING CORP.

Charles Ray
CR/lc

Attachment A

Contractor's
Change Order No. 1

City of Camdenton, Missouri of Camden County,
(Owner) State of Missouri

To McCormick Gravel & Excavating for REMOVAL & STOCKPILING HULETT LAGOON
Section of Project

You are hereby directed to make the following changes from the contract

1. Description, location and reason for change of each item and effect on completion date. (Attach additional sheets if required)

Spreading stockpiled sludge on the 22 acre area at the airport. See Attachment A.
Time extension due to poor weather conditions

2. Cost of work affected by this change order.

| Item No. | Item Description | Units Provided for | Units To Be Built | Units Add or Deduct | Contract or Unit Price | Amount Added | Amount Deducted |
|---|---|---|---|---|---|---|---|
| | Spreading Sludge | 0 | 1500 | + 1500 | 2 25 | 3,375.00 | |
| | Clearing & bush-hogging | 0 | 4 | + 4 | 400 00 | 1,600 00 | |
| | Discing | 0 | 1 | + 1 | LS | 560 00 | |
| | Seeding | 0 | 22 | + 22 | 45 00 | 990.00 | |
| | 30 day time extension -- Completion date revised to September 9, 1989. | | | | | | |
| | | | | Totals | | 6,525.00 | |

1. Contract Amount $19,530 00
2. Add or Deduct this Change Order (Additions - Deductions) + $6,525 00
3. Add or Deduct Previous Change Orders 0
4. Total Add or Deduct to Date + $6,525 00
5. Adjusted Contract Amount $26,055 00

[signature] 8/14/89 [signature] 8/15/89
Engineer Date Contractor Date

[signature]
Owner Date

Contractor's
Change Order No. 2

City of Camdenton, Missouri of Camden County,
(Owner) State of Missouri

To McCormick Gravel & Excavating for REMOVAL & STOCKPILING HULETT LAGOON
Section of Project

You are hereby directed to make the following changes from the contract

1. Description, location and reason for change of each item and effect on completion date. (Attach additional sheets if required)

Time extension due to inclement weather.

2. Cost of work affected by this change order.

| Item No. | Item Description | Units Provided for | Units To Be Built | Units Add or Deduct | Contract or Unit Price | Amount Added | Amount Deducted |
|---|---|---|---|---|---|---|---|
| 45 day time extension -- Completion date revised to October 24, 1989 | | | | | | | |
| NO COSTS INVOLVED | | | | | | | |
| | | | | Totals | | | |

1. Contract Amount $19,530 00
2. Add or Deduct this Change Order (Additions - Deductions) 0
3. Add or Deduct Previous Change Orders + $6,525 00
4. Total Add or Deduct to Date + $6,525 00
5. Adjusted Contract Amount $26,055 00

James L Kilmore 9/5/89
Engineer Date

Ronald A McCormick 9/19/89
Contractor Date

Mac Wedertz 9/25/89
Owner Date

Contractor's
Change Order No. 3

City of Camdenton, Missouri (Owner) of Camden County, State of Missouri

To McCormick Gravel & Excavating for Removal & Stockpiling Hulett Lagoon (Section of Project)

You are hereby directed to make the following changes from the contract

1. Description, location and reason for change of each item and effect on completion date. (Attach additional sheets if required)

2. Cost of work affected by this change order.

| Item No. | Item Description | Units Provided for | Units To Be Built | Units Add or Deduct | Contract or Unit Price | Amount Added | Amount Deducted |
|---|---|---|---|---|---|---|---|
| | Removal of excess soils to complete lagoon abandonment | 0 | 1 | +1 | LS | 7,000 00 | |
| | Adjustment for spreading of materials at airport for clearing brush, spreading sludge and soils, discing, and seeding | 0 | 1 | +1 | LS | 1,363 50 | |
| | | | | Totals | | | |

1. Contract Amount 19,530.00
2. Add or Deduct this Change Order (Additions - Deductions) + $8,363.50
3. Add or Deduct Previous Change Orders + $6,525 00
4. Total Add or Deduct to Date + $14,888 50
5. Adjusted Contract Amount $34,418 50

[signature] 11/30/87
Engineer Date

Contractor Date

Mac Webster
Owner Date

Former Hulett Lagoon Site
Combined PA/SI
Reference 31

Attached herewith you will find a letter dated November 01 1989 written to Attorney David Welch from Charlie Ray with Missouri Engineering Corporation, along with the Information for Bidders, Proposal Form, additional information for the contractor, and Change Order Nos 3 and 4 concerning the sludge removal at the Hulett Lagoon.

I personally inspected the sludge site at the airport with Kent and Charlie on Wednesday, October 25, 1989. Upon our inspection, it was found that there is soil that was removed from the lagoon, but there are traces of sludge mixed in with the soil.

I will be the first to admit that I am by far no expert on sludge, but is my feeling that if sludge was present at the lagoon, that it should be removed. This being not only to satisfy my concerns, but maybe more importantly, to satisfy DNR. I believe you will agree that we do not want any trouble with DNR over this lagoon sludge removal.

I realize the Mayor or Council was not advised of the additional loads being removed from the lagoon at the time, but let's just suppose we had been told beforehand that additional loads needed to be removed. . .then, would we have said no? Would we have been expert enough to know that no more sludge needed to be removed from the lagoon? Please just take a minute and think about it.

As Charlie states in his letter, weather conditions were not ideal at the time sludge was being pumped from the lagoon, and there were delays, plus each time the rains came, this caused the sludge to spread back over the area of the lagoon, which I feel would need to be removed. Apparently, the contractor felt it necessary to remove the additional soil, as it was contaminated with sludge Although, after the sludge was removed and taken to the stockpile sight and dried out, the majority removed was soil, BUT there was a percentange of sludge in the soil that was tested.

Charles also states that more tests can be performed on the soil at the stockpile sit, but you will note that the eight tests that were run cost $1000.00. Do we want to keep testing the soil and spending thousands of dollars for this?

You will note in the information attached to Charlie's letter, on page GC-20 under No. 30 ARBITRATION, that disputes will be settled by arbitration. Although, some of you may not be too familiar with arbitration, I deal with it everyday in my work, and it has been my experience that this is not the easiest way to prove a point. You may think your case is airtight, but the arbitration committee can easily blow your case right out of the water. I personally believe that if the arbitration committee saw that there was a percentage of sludge in the excess soil removed from the lagon, that they would rule in favor of the contractor Be advised this is my personal opinion, but also, I have dealt with arbitration committees for several years. Our attorney may disagree with me totally, but I do feel very strongly on this point.

I feel we can sit in the council chambers and argue and hash this matter out for several hours, and never settle the dispute. As you know, each of us are separate individuals with our own way of thinking. I am not trying to persuade any one of you in any way, but please take a little time and think carefully about this matter and just maybe, you may reconsider allowing this matter to be resolved by paying the contractor on these change orders.

I do have information from a very reliable and trustworthy individual that McCormick has alread been told that an additional $3000 00+ that he has spent on this sludge removal project will not be taken into consideration for payment, and they have apparently accepted this fact

This matter can be discussed to some extent Tuesday night, but let's not drag it out for any length of time  Please be advised that I do intend to make a motion for this additional money to be paid to McCormick and it will be up to the rest of the council to either agree or disagree  Remember, in the meantime, the sludge is just sitting idle at the airport waiting to be spread

Thank you for taking the time to read this and reconsidering all the facts involved in this matter

Again, I respect each and everyone of you in the decisions we make as a council, and I do feel that we are a strong and aggressive council who face may tough decisions each time we sit in the council chambers

Sincerely,

Kay Cyrus

*Missouri Engineering Corporation*
ENGINEERING CONSULTANTS
P O BOX 13
ROLLA, MISSOURI 65401 • PHONE 314-364-4003

November 1, 1989

Dave Welch
Attorney at Law
190 Court Circle
Camdenton, MO 65020

Dear Dave:

Since our meeting Tuesday morning, I have tried to summarize the overall situation of payment on the Hulett Lagoon Sludge Removal and Stockpiling project. I have taken a set of the contract documents and marked what I felt was pertinent information regarding this matter. Mr. McCormick feels that he is due additional funds for sludge removal. I am in agreement with him that he has removed additional material but disagree that it was actually sludge.

The specifications were very clear that the quantities shown were only estimates and that final payment would be made on the quantities actually removed and measured. On GC-8, 13.1, it states that final measurements shall not be considered changes in the work. It also states in the specifications that differing site conditions or weather conditions can govern the work to be performed and paid for. This project is very unique and the conditions encountered during the removal period were not ideal. As you are aware, the Department of Natural Resources had complete control on the approval of this material being removed, but it was at a total cost paid by the City of Camdenton.

The scope of the project included complete removal of the sludge from the lagoon site and stockpiling of this material at the south end of the airport property. I have had conversations with Mr. McCormick over concerns of the project and will try to highlight those in the following statements.

1. I have been told that even though the contractor was prepared to begin removal of the sludge during the last weeks of June, that he was told by the city to not start until after the July 4th holiday period. We lost two weeks of very favorable working days.

2. The removal process began on July 11, 1989. They had hauled approximately 650 cubic yards through July 12 at 1:30 p.m. At that time my inspector told me that they were way less than one-half done with the area. I asked how much dirt was being removed with the sludge. Was it a clean separation? The answer was that the excavation was being made to a level that showed clay material. I aksed my inspector to have Mr. McCormick to contact me.

3. Mr. McCormick called me to discuss the problems. He assured me that there was very little dirt being removed and absolutely no more than was necessary. I told him at that time, that if there was going to be more sludge, I had to take the increase to the council. His statement was that he felt that the total yardage would not exceed the 1500 cubic yards in the proposal by very much, maybe a hundred yards.

4. The sludge was left to dry after July 12. Rainfall filled the bottom of the lagoon during the following weeks and created additional pumping. The contractor attempted removal again on August 18 and 19. Rain again stopped the project on August 19.

5. After pumping on the lagoon again and drying the sludge, the contractor again started hauling on September 7 and 8. When work had stopped on August 19, I was advised by my inspector that they were nearly done and if it had not rained, they would have probably finished that day. They were at approximately 1485 cubic yards. After the rains and the contractor continued, he hauled approximately another 910 cubic yards.

In my opinion and as shown at the lagoon site, much of the soils were contaminated with copper each time the lagoon was refilled with rainwater. The reason this showed was because the copper settled out and oxidized causing the soils to appear as the same color of the sludge. Each time the contractor reworked the areas, he was forced to remove additional materials that must have appeared to be sludge when it was wet. After it dried at the stockpile site, it was obvious to me that most of it was soils. The test results that we had performed reflect that this is actually the case.

In eight samples taken from the stockpiled materials, an analysis was made to determine the sludge quantity. These are as follows:

1. 3.08% sludge
2. 0.37% sludge
3. 1.05% sludge
4. 1.53% sludge
5. 8.10% sludge
6. 33.35% sludge
7. 1.68% sludge
8. 2.03% sludge

Also the metals test show a considerable drop from the sludge samples analyzed before the project began. Concentrations of copper dropped from a high of 50,000 parts per million to a high of 5500 parts per million.

It is impossible to test every particle of the stockpiled materials to determine if this is totally representative, but I believe that is is a valid comparison. There are approximately 50 loads that would have to be tested to get an actual sludge analysis. These eight tests cost $1000.

I know that the council feels as if they were left out of this decision, but I do not think that they could have ever reached any other answer other than to continue to remove all necessary materials. This has always been the goal in order to satisfy DNR requirements.

It is my opinion, that the contractor did the work required in order to achieve the completion of the total sludge removal and should be compensated for the additional material removal in the amount of $7,826.50. In addition to this, if we continue with the project and spread the material at the airport, there would be an additional cost of $1,800 to spread the additional materials.

Hopefully this information will be of benefit to you. I would certainly like to see this issue resolved and the project completed.

Sincerely,

MISSOURI ENGINEERING CORP.

Charles Ray

Charles Ray
CR/vm

Former Hulett Lagoon Site
Combined PA/SI
Reference 32
10/20/89

Mr. Hixson & Council Members:

This letter is in regard to the cost overrun involved in the Hulett Lagoon Project.

I was in constant contact with Missouri Engineering at all stages of the job. There was an inspector on the job at all times. Missouri Engineering was well informed of all additional work necessary to complete the job, including additional pumping, extra lime & more sludge to be removed than Missouri Engineering's estimate. I was assured it was not a problem because I was to be paid by the yard for the removal.

I also want to add that I was told that if there was less than 1500 yards of sludge, I would be paid less. If there was more, I would be paid more. I accepted both possibilities as I assumed the council did

As you all know, the weather posed a problem, with an unusual frequency of rainfall. This was no one's fault but it did not allow the sludge to shrink down as it dried the way it should have This kept the bottom of the lagoon soft, making it impossible to prevent getting a small amount of

mud along with the sludge. At no time was more removed than was absolutely necessary in order to get all the sludge out.

At the bid opening for this job, I said in the presence of Mr. Ray, the mayor & the past city administrator that I knew there was a lot more than 1500 yards of sludge in there. The yardage was discussed with Missouri Engineering numerous times and I was always assured it was no problem.

My bid was quite fair. I did not "create" an overrun for my benefit. It would have been to my benefit if there had been only 1500 yards.

The prices I submitted for spreading the sludge, I believe you will also find very reasonable. But, again, all prices are unit prices.

I will attend the November 7 meeting & hope to help clear up any questions as best I can.

Sincerely,

Ron McCormick

Former Hulett Lagoon Site
Combined PA/SI
Reference 33

# City of Camdenton

112 Court Circle P O Box 1048
Camdenton MO 65020
314-346-3600

Ronnie Testerman
Department of Natural Resources
P O Box 176
Jefferson City, Mo 65102

April 9, 1990

RE Hulett Lagoon Sludge Disposal
Work Completion Summary

Dear Ronnie,

As per the approved sludge disposal plan for this project, I am submitting to DNR a work completion summary The following is a chronological recounting of the events surrounding the project -

January 1989 The fields at the airport were limed in order to improve the pH levels to 6

June, July, August 1989 The contractor mixed the sludge with lime in the lagoon and transported it to the storage site at the airport Rain delays and traffic considerations added to the length of time needed for this work

December, 1989 After allowing it to dry, the contractor began spreading the material via dry sludge applicator on the designated fields at the airport, mixing it with additional soil and discing the sludge into the ground Soils tests were taken to insure the loading rate did not exceed set limits Rain and snow delayed completion of the spreading

March, 1990 Mixing, spreading and discing were completed Soils test were taken and demonstrated that the loading was below the specified levels The fields have been seeded with a mix of Timothy and Fescue grasses in order to provide ground cover and prevent erosion

April, 1990 The fields that are below a pH level of 6 will be limed to bring them up as needed

I hope that this summary statement fulfills the requirements of the approved sludge disposal specifications Should you have any questions or require further information, please feel free to contact me

Your cooperation and assistance in helping the city is very much appreciated

Sincerely,

Kent L Hixson

Kent L Hixson

Former Hulett Lagoon Site
Combined PA/SI
Reference 34

City of Camdenton

112 Court Circle P O Box 1048
Camdenton MO 65020
314-346-3600

Mr Paul Kieler
Jacobs Engineering Group
10901 W 84th Terrace
Suite 210
Lenexa, Kansas 66214

March 23, 1992

RE Hulett Lagoon Clousre Process

Dear Mr Kieler,

Enclosed are some documents relevant to the closing of Hulett Lagoon This is the sewer lagoon that Modine, formerly Sunstrand, discharged into The lagoon was built in 1962-63 and was taken out of service in 1986-87 after Sunstrand constructed the pre-treatment facility

The actual lagoon closure wasn't completed until late 1989 I had only recently been hired by the City and was not involved in the development of the closure plan

I do know that all the sludge was taken to the municipal airport and land applied then tilled into the soil according to the DNR guidelines The berms of Hulett lagoon were turned in and mixed with on a 1 to 1 ratio

The City is in the process of leveling off the site and opening it up for a neighborhood park

If you have any questions or require further information, please feel free to contact me

Sincerely,

Kent L Hixson

Kent L Hixson
City Administrator

Sundstrand

Former Hulett Lagoon Site
Combined PA/SI
Reference 35

PRELIMINARY ASSESSMENT
SUNDSTRAND
CAMDEN COUNTY, MISSOURI

January 31, 1992

Missouri Department of Natural Resources
Hazardous Waste Program

| Prepared By: | Reviewed By: | Approved By: |
| --- | --- | --- |
| John Madras | Jim Belcher | |
| John Madras,<br>Environmental<br>Specialist | Jim Belcher,<br>Chief<br>Planning and Pre-<br>Remedial Unit | Edwin D Knight,<br>Chief<br>Superfund Section |

Date: January 31, 1992

Prepared by: John Madras
Missouri Department of Natural Resources

Site: Sundstrand
City of Camdenton, Camden County, Missouri

EPA ID No.: MOD

## 1. INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Missouri Department of Natural Resources, through a cooperative agreement with the U.S. Environmental Protection Agency, conducted a Preliminary Assessment (PA) at the Sundstrand site. The purpose of this investigation was to collect information concerning conditions at the site sufficient to assess the threat posed to human health and the environment, and to determine the need for addition investigation under CERCLA/SARA or other action. The scope of this investigation included review of available file information, a comprehensive source survey, a comprehensive target survey, and an on-site reconnaissance.

## 2. SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

### 2.1 Location

The Sundstrand site is located in the City of Camdenton, Missouri, at the center of Camden County, Missouri (Figure 1). The geographic coordinates are $38^{\circ}$ 00′ 32.5′′N latitude and $92^{\circ}$ 45′ 26′′W longitude (Reference 1). The site is located about one-half mile west of the intersections of U S. Route 54 and Missouri Route 5/7. The site can be accessed by turning west onto Sunset Drive from Missouri Route 5/7.

Camden County is characterized by a temperate climate. Summers are warm and humid with daily temperatures reaching $90^{\circ}$F or higher. The winter months are generally cold with normal daily temperatures of $22^{\circ}$ to $42^{\circ}$F. Net annual precipitation for the area is 42 inches (Reference 2, pages 1, 13, 43).

### 2.2 Site Description

The suspected area of contamination includes soil beneath the manufacturing facility, and soil and fill material comprising loading areas and parking lot adjacent to the facility on the west (Reference 3,4) Trichloroethylene (TCE) and 1,1,1-trichloroethane (TCA) have been detected in the soil below the facility and in borings in the adjacent areas outside of the facility (Reference 5) Groundwater may be affected.

Concentrations of TCE and TCA detected at the facility are shown on Figure 2 (from Reference 5)

The facility is located on a gently, sloping terrain which drops steeply toward a permanently flowing tributary of Lake of the Ozarks.

The Sundstrand site appears to be the sole source of potential TCE or TCA contamination in the vicinity of the site itself. Other potential sources are present in the Camdenton area (Reference 6; Electrovert USA site).

Sundstrand was an interim status hazardous waste treatment, storage, and disposal facility (EPA ID# MOD06249351). The Department requested a Part B application to be submitted. The facility was sold to Modine Heat Transfer, Inc , a wholly owned subsidiary of Modine Manufacturing Company. The new owner stated their intention to complete the closure begun by Sundstrand and operate the facility as a "generator only" facility (Reference 7).

Wastewater from the facility was discharged to the City of Camdenton sanitary discharge system. At the time of the alleged release, that discharge was delivered to the City's "Factory" lagoon. This lagoon was subsequently closed and discharges were transferred to the City's new wastewater treatment facility

### 2.3 Operational History and Waste Characteristics

To date, no governmental agencies have conducted sampling at this site. Routine water well sampling has been conducted for the City of Camdenton wells, the closest of which is about 200 feet from the site. No contamination was detected (Reference 8).

Modine Heat Transfer, Inc., the present owner and operator of the facility, expressed an interest in conducting sampling following a meeting with the Department of Natural Resources on March 11, 1991 (Reference 9). A sampling plan was submitted; however, it was not approved (Reference 10).

After one revision of the plan, the owner decided to proceed without approval by the Department (Reference 11). Sampling was conducted October 5-8, 1991, without approval of the plan or oversight of the sampling by the U S Environmental Protection Agency or the state.

No removal actions or other response actions have occurred at the site.

## 3 GROUNDWATER PATHWAY

### 3.1 Hydrogeologic Setting

The following information is reported from the Missouri Division of Geology and Land Survey (Reference 12)

The bedrock at the site is the Roubidoux Formation The surficial materials developed overlying the bedrock are composed of stratified layers of hard, broken chert and sandstone fragments in red, silty clay

Beds of massive boulders, some over three feet thick are not uncommon This residuum is three to nine feet thick

The area is underlain by a thick sequence of Ordovician and Cambrian aged rocks The sequence is primarily dolomite, and may be up to 1,800 feet thick The section that includes the principle aquifers through the Potosi Dolomite is uninterrupted by a consistent confining bed This part of the section is approximately 1,000 feet thick, and is made up of dolomites except for the Roubidoux Formation, which contains intervals of dolomitic sandstone, and the Gunter Sandstone Member of the Gasconade Dolomite Though some units in this sequence may act as relative confining layers, the entire section from the Potosi Dolomite up through the Roubidoux formation should be considered one aquifer

The Davis Formation contains the only persistent confining shale bed in the section It serves as a boundary between the lower part of the Cambrian sequence, and the Potosi and stratigraphically higher formations Vertical circulation of water has enlarged openings along joints and fractures, allowing freer passage of water from the surface through the Potosi Dolomite

There are no major geologic structures in the target area to constitute an aquifer discontinuity There are also no topographic features which transect an aquifer within the target area

The aquifer underlying the site is a karst aquifer Karst features are particularly well developed in the Roubidoux Formation, which is the uppermost bedrock beneath the site Segments of the unnamed stream downgradient from the site are losing

### 3 2 Groundwater Targets

The majority of the population within a 4-mile radius relies on public water supplies, either the City of Camdenton or one of the other public water supplies The Camdenton public water supply is a blended system that draws water from three wells All three wells are within one mile of the site, and together they serve the population of 2,561 (Reference 13) Sampling of the City of Camdenton wells in 1987 and 1991 did not detect contamination by the hazardous substances of concern at this site (Reference 8)

In addition, there are many other public water supply wells located in the vicinity of the site, including the wells for the City of Linn Creek (see Table 1) There are approximately 374 homes within four miles which use private wells for drinking water (Reference 1) At 2 4 persons per household (the average for Camden County, Reference 14), this equates to 898 residents

The residence using a private well and located closest to a suspected source of the contamination is about 3,700 feet from the western side of the Modine plant. No residences relying on private wells are located within a 0.25-mile radius of this potential source (Reference 1).

All water wells in the area produce from the same aquifer. Most of the lake homes, restaurants, condominiums, and subdivisions have private water supplies, as there are no rural water districts in the area. There is no wellhead protection area in the vicinity of the site.

### 3.3 Groundwater Conclusions

A release of hazardous substances to the Cambro-Ordovician aquifer is possible through the on-site disposal of solvents. TCE has been detected in area springs in the vicinity of the site, although dye trace work in the Camdenton areas has not been successful in identifying the recharge area of the spring. Due to the relatively high conductivity of the aquifer, potential widespread migration of contaminants is high. There are no residents whose wells are within 0.25 mile of the potential source. TCE and TCA are very mobile contaminants and the direction of groundwater flow is unknown. As no well contamination has been detected in wells close to the site, the remainder of residents dependent upon private wells within four miles are considered to be secondary targets.

## 4. SURFACE WATER PATHWAY

### 4.1 Hydrologic Setting

The site is located near the divide between two small branches of an unnamed stream which drains west to the Niangua Arm of the Lake of the Ozarks. Water appears to run off the site to the south and southwest. There are no runoff containment structures on-site. Discharge from the drainage pipe on the west side of the parking lot runs through an excavated area and into a well defined gully west of the site The two drainage pipes on the south side of the facility do not appear to ever discharge large quantities of water since there is no channel leading from the pipe. The site is less than one-half mile southwest of the divide between the Linn Creek drainage and the Niangua River drainage. The two-year 24-hour rainfall for the site is 3.5 inches.

Drainage from the site flows overland to the south and southwest down a steep slope for approximately 700 feet before it enters an unnamed stream, which flows southwest to the Lake of the Ozarks. This unnamed stream contains losing segments The drainage area of the site is less than 50 acres The site is not located in a floodplain

Since this is a karst area, water issuing from springs within the groundwater target area should be considered for the surface water pathway. This would

include Ha Ha Tonka Spring and an unnamed spring near the City of Linn Creek TCE has been previously detected in Ha Ha Tonka Spring

**4 2 Surface Water Targets**

The unnamed tributary is a permanently flowing water body at the probable point of entry of contaminants from the site (Reference 1) This tributary is not a classified stream in the Missouri Water Quality Standards It is subject to the general criteria for protection of all waters of the State of Missouri (Reference 15, page 11) Lake of the Ozarks, into which this unnamed creek flows, is classified for the protection of livestock and wildlife watering, the protection of warm water aquatic life and human health/fish consumption, whole body contact recreation, and boating and canoeing (Reference 15, page 32)

There are no identified drinking water intakes in the vicinity of the site

There are no identified wetlands in the vicinity of the site There are sensitive environments present in the vicinity of the site (References 16, 17), although they do not occur in surface waters

**4 3 Surface Water Conclusions**

There are no present indications that hazardous substances have been released into surface waters or into areas that drain toward permanently flowing surface waters The waters of the unnamed tributary appear to be recharged at least partially from shallow groundwater, which is suspected to be contaminated There are no water intakes located on the tributary or on the Lake of the Ozarks No identified wetlands are present in the vicinity of the site A federally designated endangered species, as well as other sensitive environments, are present in the vicinity of the site Primary targets include the fisheries of the tributary and Lake of the Ozarks, and the sensitive environments

5 SOIL EXPOSURE AND AIR PATHWAYS

**5 1 Physical Conditions**

At this point, no areas of surface soil contamination have been identified Hazardous substances have been detected at shallow depths in parking areas west of the building, and in soil below the floor of the building (the pit under the vapor degreaser)

**5 2 Soil and Air Targets**

The potential source of the contamination is an active facility Residences are located on properties adjacent to the facility The residence nearest any of the potential sources is located about 200 feet from the former west wall of

the facility (the alleged disposal area). There are 808 residences located within 0.25 mile of this location. The Modine property is fenced with a gate at the road entrance The total population within a 4-mile radius of the lagoon is 6,394 (Reference 14).

There are no wetlands of at least five acres in the vicinity of the site Smaller wetlands may be present. The Gray Bat (Myotis griesescens) is federally and state listed as endangered. The bat is known from four caves in the vicinity of Camdenton. The first cave is 2 1 miles from the site. Spinulose shield fern (Dryopteris carthusiana) is known to occur in the vicinity of the site in Red Sink Natural Area and is state listed endangered. Other sensitive environments are also present in the vicinity of the site (References 16 and 17).

### 5.3 Soil Exposure and Air Pathway Conclusions

The soil exposure pathway appears to pose a minimal threat at the site due to the inaccessibility of the closest potential source. Although TCE is volatile when exposed to air, a release of TCE to air is not suspected because of the length of time since releases were alleged to have occurred. In addition, many of the sites are covered with pavement, buildings, or vegetation.

## 6. SUMMARY AND CONCLUSIONS

The Sundstrand site is located in the City of Camdenton, Missouri, at the center of Camden County, Missouri (Figure 1). The site is located about one-half mile west of the intersections of U.S. Route 54 and Missouri Route 5/7 The suspected area of contamination includes soil beneath the Modine Heat Transfer (formerly Sundstrand) manufacturing facility, and soil and fill material comprising loading areas and parking lot adjacent to the facility on the west. The contaminants are known to include trichloroethylene (TCE) and 1,1,1-trichloroethane (TCA). Due to the relatively high conductivity of the aquifer, potential widespread migration of contaminants is high There are no residents whose private wells are within 0.25 mile of the potential source TCE and TCA are very mobile contaminants and the direction of groundwater flow is unknown There are no present indications that hazardous substances have been released into surface waters or into areas that drain toward permanently flowing surface waters. There are no water intakes located on the tributary or on Lake of the Ozarks No identified wetlands are present in the vicinity of the site. Primary targets include the fisheries of the tributary and Lake of the Ozarks, a federally designated endangered species, and other sensitive environments The soil exposure pathway appears to pose a minimal threat at the site due to the inaccessibility of the closest potential source.

**REFERENCES**


1 U S Geological Survey, 7 1/2 minute topographic quadrangle maps showing site location (Green Bay Terrace, Camdenton, Decaturville, Ha Ha Tonka)

2 The Climatic Atlas of the United States, U S Department of Commerce, 1983

3 Original complaint

4 Former employee's statement

5 Law Environmental, Inc report

6 CERCLIS, Camden County sites

7 MDNR hazardous waste files Hazardous Waste Registrations, Modine correspondence of 12/3/90 and 12/10/91, Sundstrand correspondence of 9/6/90

8 MDNR sampling results

9 Record of Modine/MDNR meeting

10 MDNR comment letter on sampling plan

11 Modine letter stating that it would proceed with sampling

12 Edith Starbuck, Missouri Division of Geology and Land Survey, Memorandum, 1/13/92

13 Phone call with Rick Hixson, 1/24/92

14 Census Bureau, 1990 data

15 Missouri Water Quality Standards, 10 CSR 20-7 031

16 Dan Dichkneite, Missouri Department of Conservation, letter dated 9/6/91

17 Jerry Brabender, U S Fish and Wildlife Service, letter dated 9/16/91

Sundstrand PA
January 31, 1992

TABLE 1

GROUNDWATER TARGETS

Public Water Supplies

City of Camdenton #3 (Rodeo): total depth 940 feet; cased depth 450 feet; aquifer Cambrian-Ordovician; capacity 320 gpm; distance from site 1.0 miles population served 622.

City of Camdenton #4 (Blair): total depth 1045 feet; cased depth 400 feet; aquifer Cambrian-Ordovician; capacity 300 gpm; distance from site 0 6 miles; population served 576.

City of Camdenton #6 (Mulberry): total depth 900 feet; cased depth 400 feet; aquifer Cambrian-Ordovician; capacity 575 gpm; distance from site 08 miles; population served 1105.

City of Linn Creek #1: total depth 385 feet; cased depth 170 feet; aquifer Cambrian-Ordovician; capacity 100 gpm; distance from site 2.9 miles; population served ___.

City of Linn Creek #2: total depth 860 feet; cased depth 528 feet; aquifer Cambrian-Ordovician; capacity 50 gpm; distance from site 3 1 miles; population served ___.

Camden PWSD #2: total depth 848 feet; cased depth 330 feet; aquifer Cambrian-Ordovician; capacity 100 gpm; distance from site 4 0 miles; population served ___.

Autumn Village: cased depth 260 feet; aquifer Cambrian-Ordovician; capacity 50 gpm; distance from site 1.4 miles; population served ___.

Camdenton Medical Center: total depth 1.3 feet; cased depth ___ feet; aquifer Cambrian-Ordovician; capacity ___ gpm; distance from site 1.4 miles; population served ___

Camdenton Windsor Estates: total depth 600 feet; cased depth 400 feet; aquifer Cambrian-Ordovician; capacity 140 gpm; distance from site 1 5 miles; population served ___

Cape of the Woods: total depth ___ feet; cased depth ___ feet; aquifer Cambrian-Ordovician; capacity ___ gpm; distance from site ___ miles; population served ___

Department of Conservation: elevation ___ feet; total depth ___ feet; cased depth ___ feet; aquifer Cambrian-Ordovician; capacity ___ gpm; distance from site ___ miles; population served ___.

TABLE 1

(continued)

New Tribes: total depth ___ feet; cased depth ___ feet; aquifer Cambrian-Ordovician; capacity ___ gpm; distance from site 4.0 miles; population served ___.

Oak Bluff Condominiums: total depth 545 feet; cased depth 350 feet; aquifer Cambrian-Ordovician; capacity 60 gpm; distance from site 2.7 miles; population served ___.

Southway Terrace MHC: total depth 505 feet; cased depth 350 feet; aquifer Cambrian-Ordovician; capacity ___ gpm; distance from site 2.5 miles; population served ___.

Watkins Subdivision: total depth 690 feet; cased depth 440 feet; aquifer Cambrian-Ordovician; capacity 60 gpm; distance from site 1.8 miles; population served ___.

Whispering Hills: total depth ___ feet; cased depth ___ feet; aquifer Cambrian-Ordovician; capacity __ gpm; distance from site ___ miles; population served ___.

___ means no information obtained.

Private Water Supplies

Many motels, hotels, and restaurants along Highway 54 south of Camdenton.

All of the residences not served by the above systems

Former Hulett Lagoon Site
Combined PA/SI
Reference 36

MISSOURI DEPARTMENT OF NATURAL RE
DIVISION OF ENVIRONMENTAL QUAL
ENVIRONMENTAL SERVICES PROGRAM

RECEIVED

JAN 4 1993

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RE

Site Sampling Report
Sundstrand Site
Camdenton, MO
July 20 through July 31, 1992

## INTRODUCTION

As part of a site inspection authorized by the Federal Comprehensive Environmental Response, Compensation, and Liability Act, sampling was conducted at the Sundstrand Site in Camdenton, Missouri. The sampling was requested by the Missouri Department of Natural Resources (MDNR), Hazardous Waste Program (HWP), to determine whether hazardous substance releases from the Sundstrand Tubular Products facility (presently Modine Heat Transfer) has caused groundwater contamination in the area. Previous sampling conducted by Modine contractors indicated that soils around the site have been contaminated with trichloroethylene (TCE), 1,1,1 trichloroethane (TCA), tetrachloroethylene (PCE) and vinyl chloride.

Sampling during this inspection included soil and groundwater produced from the construction of monitoring wells on Modine Heat Transfer property, neighboring private wells, surface water from a creek downgradient from the site, and a spring David Mosby of the MDNR, Environmental Services Program (ESP), collected samples and provided contractor oversite. Edith Starbuck of the MDNR, Division of Geology and Land Survey, was present throughout the inspection to provide technical support during well drilling. Floyd Chilcutt and Bert Williams operated the drill rig for Layne-Western Company, subcontractors for the site. Don Mans of Modine Manufacturing Company split some of the samples collected during the inspection. The sampling data will be used in scoring the site according to the U.S. EPA's hazard ranking system.

## METHODS

Two monitoring wells (MW#1 and MW#2) were drilled and sampled during the site inspection. An air-rotary drill rig was used for well construction. Monitoring well #1 (MW#1) was drilled south of the facility parking lot at a location considered downgradient of the contaminated area. Monitoring well #2 (MW#2) was drilled near the northeast side of the facility at a location considered to be upgradient of the contamination. (See Appendix A for sampling locations.)

During drilling, soil was collected at five-foot intervals with a split spoon sampler and placed in containers with stainless steel spoons. Surface samples at both drilling locations were collected as direct grabs with stainless steel spoons because samples at this depth could not be collected with the split spoon sampler. Soil samples and drilling activities were monitored for organic vapors using a flame ionization detector (FID) or a photoionization detector (PID).

Drilling of wells ceased when sufficient water was encountered in the desired monitoring zone. After drilling was completed, wells were cased, screened, and grouted by Layne-Western and developed by MDNR and Layne-Western personnel. Wells were developed with a Grundfos submersible pump and/or stainless steel or Teflon bailer. Wells were purged until water turbidity decreased or until field parameters of conductivity, pH, and temperature, measured after each well volume, stabilized within 10% of the prior reading. Three volumes were purged from both wells during development.

Wells were sampled no earlier than the following day after development. Prior to sampling, one to three additional well volumes were purged depending on field parameter stability. Samples were collected by lowering a stainless steel or Teflon bailer to the bottom of the water column, pulling the bailer back up through the well, and filling sample containers directly

Groundwater was sampled from three private wells located downgradient from the site at the E.M Gillemberg, Robert E. Bailey, and Steve Fera residences. Samples were collected from an outside tap after running water out of the lines for three to five minutes.

Two grab samples were collected of surface water downgradient of the site by submersing the appropriate containers into the water body. A small creek, which flows through Jarvis Hollow (just below MW#1) and Ha Ha Tonka Spring, which flows into the Lake of the Ozarks approximately 2 $^1/_4$ miles south of the site, were sampled.

An equipment blank was collected of the rinsate from the decontamination of the pump and hose used to develop and purge the wells. This sample was collected after sampling MW#1 and before sampling MW#2. Tap water from the facility was used as the rinse water.

The following samples were collected at the above mentioned locations:

| SAMPLE # | LOCATION | SAMPLE TYPE | DATE |
|---|---|---|---|
| 92-6915 | MW#1 10-12 feet deep | soil boring | 7/20/92 |
| 92-6916 | MW#1 15-17 feet deep | soil boring | 7/20/92 |
| 92-6917 | MW#1 20-20.5 feet deep | soil boring | 7/20/92 |
| 92-6918 | creek below site in Jarvis Hollow | surface water | 7/22/92 |
| 92-6919 | Ha Ha Tonka Spring at state park | surface water | 7/22/92 |
| 92-6920 | E.M. Gillemberg residence | groundwater | 7/28/92 |
| 92-6921 | Robert E. Bailey residence | groundwater | 7/28/92 |
| 92-6922 | Steve Fera residence | groundwater | 7/28/92 |
| 92-6923 | MW#2 0-3 inches deep | soil grab | 7/28/92 |
| 92-6924 | MW#2 5-5.5 feet deep | soil boring | 7/28/92 |
| 92-6925 | MW#2 10-12 feet deep | soil boring | 7/28/92 |
| 92-6926 | MW#2 15-16 feet deep | soil boring | 7/28/92 |
| 92-6927 | MW#2 20-22 feet deep | soil boring | 7/28/92 |
| 92-6928 | MW#1 | groundwater | 7/30/92 |
| 92-6930 | Sundstrand Site | rinsate blank | 7/30/92 |
| 92-6931 | MW#2 | groundwater | 7/31/92 |
| 92-6932 | MW#1 0-3 inches deep | soil grab | 7/31/92 |

All samples were analyzed for volatile organics at the state's environmental laboratory within the Environmental Services Program in Jefferson City. Each sample was given a numbered tag and the corresponding number was recorded on a chain-of-custody form. Other laboratory procedures were followed according to the requirements and standard operating procedures of the Preliminary Assessment/Site Inspection Quality Assurance Project Plan for Fiscal Year 1992.

## OBSERVATIONS

Voids at the bedrock/soil interface or in the competent rock itself impeded drilling progress and well construction at MW#1 An outer casing of steel had to be set 80 feet deep and grouted around the outside in order to advance this well to the desired depth

Total well depth of MW#1 was 161 feet and MW#2 was 197 feet. Static water levels were 144 feet and 174.5 feet for MW#1 and MW#2, respectively.

Water in the monitoring wells changed from turbid and reddish-brown, to silty and grey, and finally to colorless and clear during development and purging Since well samples were collected from the bottom of the water column, they were grey and silty, even though water from the top of the water column was colorless and clear.

No organic vapors were detected in the soil borings or drilling air returns from any of the wells.

Soil samples were predominantly composed of red clay Amounts of chert, limestone, topsoil, sandstone, and stringers of tan-colored clay varied with depth and location. Soil from the boring of MW#2 contained more tan clay and sand than MW#1.

Don Mans reported in a phone conversation to Dave Mosby that the sample they split of MW#2 contained low levels of TCE below the detection level used by the MDNR laboratory. Modine did not split the water sample of MW#1.

## RESULTS

See Appendix B for sample results.

Submitted by

David E Mosby
Environmental Specialist
Superfund Unit
Environmental Services Program

Date Dec. 31, 1992

Approved by

James H Long
Director
Environmental Services Program

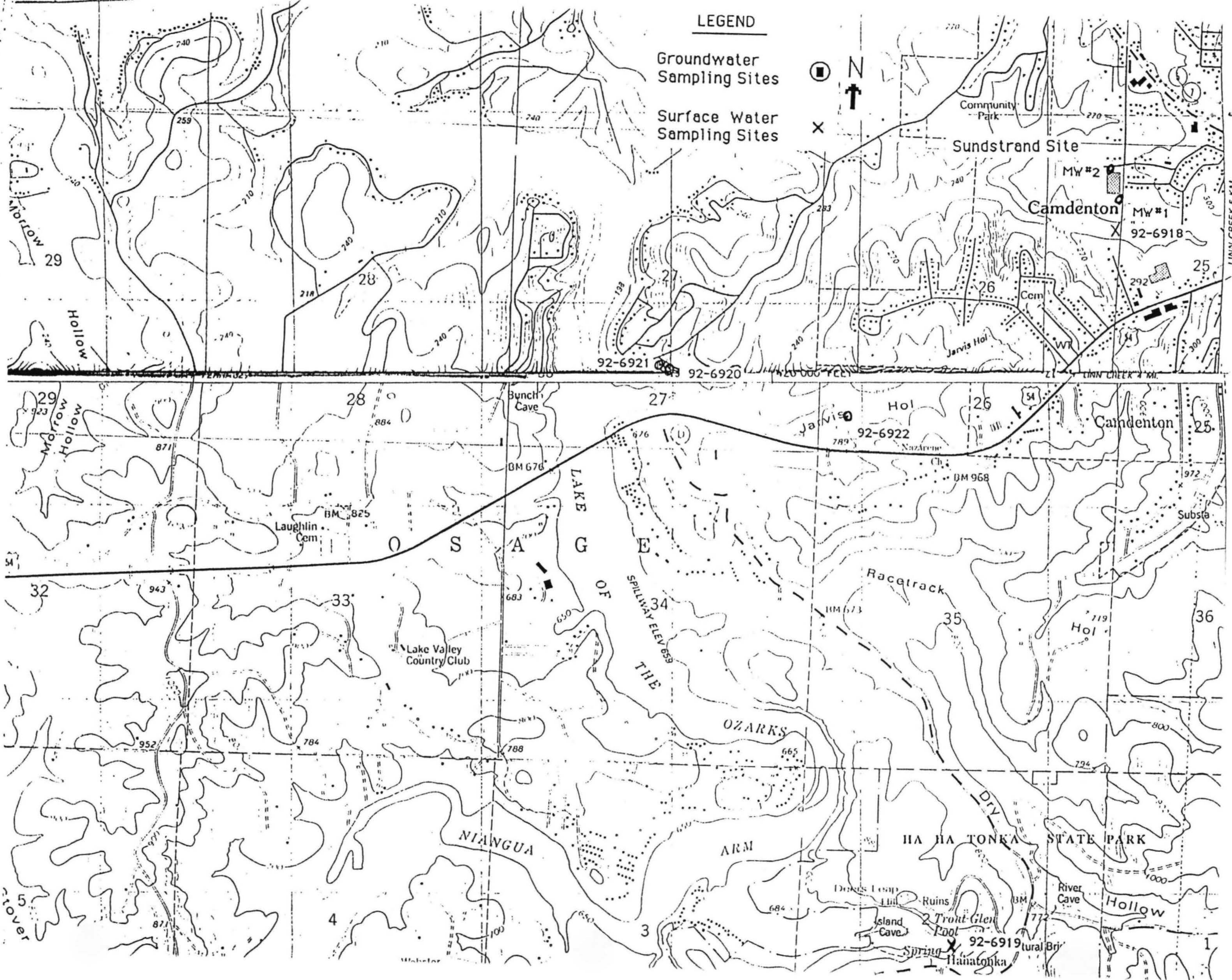
JHL dmd

c Julie Bloss, Environmental Specialist, PA/SI Unit, Superfund Section, Hazardous Waste Program

APPENDIX A

SAMPLING REPORT
SUNDSTRAND SITE
CAMDENTON, MO

Site Map


LEGEND
Groundwater Sampling Sites
Surface Water Sampling Sites
N
Sundstrand Site
Community Park
MW#2
MW#1
Camdenton
92-6918
92-6921
92-6920
92-6922
92-6919
Bunch Cave
Jarvis Hol
Laughlin Cem
LAKE OF THE OZARKS
O S A G E
SPILLWAY ELEV 659
Lake Valley Country Club
Racetrack Hol
NIANGUA ARM
Dry Hollow
HA HA TONKA STATE PARK
River Cave
Island Cave
Ruins
Trout Glen Pool
Spring
Morrow Hollow
Nazarene Ch
Substa
Cem
BM 676
BM 825
BM 968

APPENDIX B

SAMPLING REPORT
SUNDSTRAND SITE
CAMDENTON, MO

Sampling Data
July 20 through July 31, 1992

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6915

Reported to DAVID MOSBY
Affiliation SPFD

Date 12/30/92
Project Code 3658/3000

Sample Description
SUNDSTRAND (MODINE MANUFACTURING CO ) SITE
CAMDENTON, MO , GRAB OF BOREHOLE CORE
OF SOIL AT 10-12 FT , MW# 1

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/20/92

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 25 ug/Kg |
| 1,1,2,2-Tetrachloroethane | < 25 ug/Kg |
| 1,1,2-Trichloroethane | < 25 ug/Kg |
| 1,1-Dichloroethane | < 25 ug/Kg |
| 1,1-Dichloroethylene | < 25 ug/Kg |
| 1,2-Dichloroethane | < 25 ug/Kg |
| 1,2-Dichloroethene (Total) | < 25 ug/Kg |
| 1,2-Dichloropropane | < 25 ug/Kg |
| 2-Butanone | < 100 ug/Kg |
| 2-Hexanone | < 100 ug/Kg |
| 4-Methyl-2-Pentanone | < 100 ug/Kg |
| Acetone | < 100 ug/Kg |
| Benzene | < 25 ug/Kg |
| Bromodichloromethane | < 25 ug/Kg |
| Bromoform | < 25 ug/Kg |
| Bromomethane | < 25 ug/Kg |
| Carbon Disulfide | < 25 ug/Kg |
| Carbon Tetrachloride | < 25 ug/Kg |
| Chlorobenzene | < 25 ug/Kg |
| Chloroethane | < 25 ug/Kg |

Page 2
Sample no 92-6915
Date 12/30/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 25 ug/Kg |
| Chloromethane | < 25 ug/Kg |
| cis-1,3-Dichloropropene | < 25 ug/Kg |
| Dibromochloromethane | < 25 ug/Kg |
| Ethylbenzene | < 25 ug/Kg |
| Methylene Chloride | < 25 ug/Kg |
| Styrene | < 25 ug/Kg |
| Tetrachloroethene | < 25 ug/Kg |
| Toluene | < 25 ug/Kg |
| trans-1,3-Dichloropropene | < 25 ug/Kg |
| Trichloroethene | < 25 ug/Kg |
| Vinyl Acetate | < 100 ug/Kg |
| Vinyl Chloride/Chloroethene | < 25 ug/Kg |
| Xylenes (Total) | < 25 ug/Kg |

COMMENTS Analyzed by GC/MS at the Missouri DNR laboratory

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6916

Reported to DAVID MOSBY — Date 12/30/92
Affiliation SPFD — Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF BOREHOLE CORE
OF SOIL AT 15-17 FT , MW# 1

Collected by DAVID MOSBY — Date 07/20/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 25 ug/Kg |
| 1,1,2,2-Tetrachloroethane | < 25 ug/Kg |
| 1,1,2-Trichloroethane | < 25 ug/Kg |
| 1,1-Dichloroethane | < 25 ug/Kg |
| 1,1-Dichloroethylene | < 25 ug/Kg |
| 1,2-Dichloroethane | < 25 ug/Kg |
| 1,2-Dichloroethene (Total) | < 25 ug/Kg |
| 1,2-Dichloropropane | < 25 ug/Kg |
| 2-Butanone | < 100 ug/Kg |
| 2-Hexanone | < 100 ug/Kg |
| 4-Methyl-2-Pentanone | < 100 ug/Kg |
| Acetone | < 100 ug/Kg |
| Benzene | < 25 ug/Kg |
| Bromodichloromethane | < 25 ug/Kg |
| Bromoform | < 25 ug/Kg |
| Bromomethane | < 25 ug/Kg |
| Carbon Disulfide | < 25 ug/Kg |
| Carbon Tetrachloride | < 25 ug/Kg |
| Chlorobenzene | < 25 ug/Kg |
| Chloroethane | < 25 ug/Kg |

Page 2
Sample no 92-6916
Date 12/30/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 25 ug/Kg |
| Chloromethane | < 25 ug/Kg |
| cis-1,3-Dichloropropene | < 25 ug/Kg |
| Dibromochloromethane | < 25 ug/Kg |
| Ethylbenzene | < 25 ug/Kg |
| Methylene Chloride | < 25 ug/Kg |
| Styrene | < 25 ug/Kg |
| Tetrachloroethene | < 25 ug/Kg |
| Toluene | < 25 ug/Kg |
| trans-1,3-Dichloropropene | < 25 ug/Kg |
| Trichloroethene | < 25 ug/Kg |
| Vinyl Acetate | < 100 ug/Kg |
| inyl Chloride/Chloroethene | < 25 ug/Kg |
| ylenes (Total) | < 25 ug/Kg |

COMMENTS Analyzed by GC/MS at the Missouri DNR laboratory

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6917

Reported to DAVID MOSBY — Date 12/30/92
Affiliation SPFD — Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF BOREHOLE CORE
OF SOIL AT 20-20 5 FT , MW# 1

Collected by DAVID MOSBY — Date 07/20/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 25 ug/Kg |
| 1,1,2,2-Tetrachloroethane | < 25 ug/Kg |
| 1,1,2-Trichloroethane | < 25 ug/Kg |
| 1,1-Dichloroethane | < 25 ug/Kg |
| 1,1-Dichloroethylene | < 25 ug/Kg |
| 1,2-Dichloroethane | < 25 ug/Kg |
| 1,2-Dichloroethene (Total) | < 25 ug/Kg |
| 1,2-Dichloropropane | < 25 ug/Kg |
| 2-Butanone | < 100 ug/Kg |
| 2-Hexanone | < 100 ug/Kg |
| 4-Methyl-2-Pentanone | < 100 ug/Kg |
| Acetone | < 100 ug/Kg |
| Benzene | < 25 ug/Kg |
| Bromodichloromethane | < 25 ug/Kg |
| Bromoform | < 25 ug/Kg |
| Bromomethane | < 25 ug/Kg |
| Carbon Disulfide | < 25 ug/Kg |
| Carbon Tetrachloride | < 25 ug/Kg |
| Chlorobenzene | < 25 ug/Kg |
| Chloroethane | < 25 ug/Kg |

Sample no 92-6917
Date 12/30/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 25 ug/Kg |
| Chloromethane | < 25 ug/Kg |
| cis-1,3-Dichloropropene | < 25 ug/Kg |
| Dibromochloromethane | < 25 ug/Kg |
| Ethylbenzene | < 25 ug/Kg |
| Methylene Chloride | < 25 ug/Kg |
| Styrene | < 25 ug/Kg |
| Tetrachloroethene | < 25 ug/Kg |
| Toluene | < 25 ug/Kg |
| trans-1,3-Dichloropropene | < 25 ug/Kg |
| Trichloroethene | < 25 ug/Kg |
| Vinyl Acetate | < 100 ug/Kg |
| Vinyl Chloride/Chloroethene | < 25 ug/Kg |
| Xylenes (Total) | < 25 ug/Kg |

COMMENTS Analyzed by GC/MS at the Missouri DNR laboratory

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6918

Reported to DAVID MOSBY — Date 12/30/92
Affiliation SPFD — Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF CREEK DOWN HILL FROM FACILITY

Collected by DAVID MOSBY — Date 07/22/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/L |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/L |
| 1,1,2-Trichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethylene | < 5 0 ug/L |
| 1,2-Dichloroethane | < 5 0 ug/L |
| 1,2-Dichloroethene (Total) | < 5 0 ug/L |
| 1,2-Dichloropropane | < 5 0 ug/L |
| 2-Butanone | < 100 ug/L |
| 2-Hexanone | < 100 ug/L |
| 4-Methyl-2-Pentanone | < 100 ug/L |
| Acetone | < 100 ug/L |
| Benzene | < 5 0 ug/L |
| Bromodichloromethane | < 5 0 ug/L |
| Bromoform | < 5 0 ug/L |
| Bromomethane | < 5 0 ug/L |
| Carbon Disulfide | < 5 0 ug/L |
| Carbon Tetrachloride | < 5 0 ug/L |
| Chlorobenzene | < 5 0 ug/L |
| Chloroethane | < 5 0 ug/L |
| Chloroform | < 5 0 ug/L |

Page 2
Sample no 92-6918
Date 12/30/92

| PARAMETERS | RESULTS |
|---|---|
| Chloromethane | < 5 0 ug/L |
| cis-1,3-Dichloropropene | < 5 0 ug/L |
| Dibromochloromethane | < 5 0 ug/L |
| Ethylbenzene | < 5 0 ug/L |
| Methylene Chloride | < 5 0 ug/L |
| Styrene | < 5 0 ug/L |
| Tetrachloroethene | < 5 0 ug/L |
| Toluene | < 5 0 ug/L |
| trans-1,3-Dichloropropene | < 5 0 ug/L |
| Trichloroethene | < 5 0 ug/L |
| Vinyl Acetate | < 100 ug/L |
| Vinyl Chloride/Chloroethene | < 5 0 ug/L |
| Xylenes (Total) | < 5 0 ug/L |

COMMENTS Analyzed by GC/MS at the Missouri DNR Environmental Services Program laboratory

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6919

Reported to DAVID MOSBY — Date 12/30/92
Affiliation SPFD — Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF HA HA TONKA SPRING
HA HA TONKA STATE PARK

Collected by DAVID MOSBY — Date 07/22/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/L |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/L |
| 1,1,2-Trichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethylene | < 5 0 ug/L |
| 1,2-Dichloroethane | < 5 0 ug/L |
| 1,2-Dichloroethene (Total) | < 5 0 ug/L |
| 1,2-Dichloropropane | < 5 0 ug/L |
| 2-Butanone | < 100 ug/L |
| 2-Hexanone | < 100 ug/L |
| 4-Methyl-2-Pentanone | < 100 ug/L |
| Acetone | < 100 ug/L |
| Benzene | < 5 0 ug/L |
| Bromodichloromethane | < 5 0 ug/L |
| Bromoform | < 5 0 ug/L |
| Bromomethane | < 5 0 ug/L |
| Carbon Disulfide | < 5 0 ug/L |
| Carbon Tetrachloride | < 5 0 ug/L |
| Chlorobenzene | < 5 0 ug/L |
| Chloroethane | < 5 0 ug/L |

Page 2
Sample no 92-6919
Date 12/30/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 5 0 ug/L |
| Chloromethane | < 5 0 ug/L |
| cis-1,3-Dichloropropene | < 5 0 ug/L |
| Dibromochloromethane | < 5 0 ug/L |
| Ethylbenzene | < 5 0 ug/L |
| Methylene Chloride | < 5 0 ug/L |
| Styrene | < 5 0 ug/L |
| Tetrachloroethene | < 5 0 ug/L |
| Toluene | < 5 0 ug/L |
| trans-1,3-Dichloropropene | < 5 0 ug/L |
| Trichloroethene | < 5 0 ug/L |
| Vinyl Acetate | < 100 ug/L |
| inyl Chloride/Chloroethene | < 5 0 ug/L |
| Xylenes (Total) | < 5 0 ug/L |

COMMENTS Analyzed by GC/MS at the Missouri DNR Environmental Services Program laboratory

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6920

Reported to DAVID MOSBY — Date 9/02/92
Affiliation SPFD — Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF WELL FROM E M GILLENBERG HOUSEHOLD

Collected by DAVID MOSBY — Date 07/28/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/L |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/L |
| 1,1,2-Trichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethylene | < 5 0 ug/L |
| 1,2-Dichloroethane | < 5 0 ug/L |
| 1,2-Dichloroethene (Total) | < 5 0 ug/L |
| 1,2-Dichloropropane | < 5 0 ug/L |
| 2-Butanone | < 100 ug/L |
| 2-Hexanone | < 50 ug/L |
| 4-Methyl-2-Pentanone | < 50 ug/L |
| Acetone | < 100 ug/L |
| Benzene | < 5 0 ug/L |
| Bromodichloromethane | < 5 0 ug/L |
| Bromoform | < 5 0 ug/L |
| Bromomethane | < 5 0 ug/L |
| Carbon Disulfide | < 5 0 ug/L |
| Carbon Tetrachloride | < 5 0 ug/L |
| Chlorobenzene | < 5 0 ug/L |
| Chloroethane | < 5 0 ug/L |

Page 2
Sample no 92-6920
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 5 0 ug/L |
| Chloromethane | < 5 0 ug/L |
| cis-1,3-Dichloropropene | < 5 0 ug/L |
| Dibromochloromethane | < 5 0 ug/L |
| Ethylbenzene | < 5 0 ug/L |
| Methylene Chloride | < 5 0 ug/L |
| Styrene | < 5 0 ug/L |
| Tetrachloroethene | < 5 0 ug/L |
| Toluene | < 5 0 ug/L |
| trans-1,3-Dichloropropene | < 5 0 ug/L |
| Trichloroethene | < 5 0 ug/L |
| Vinyl Acetate | < 100 ug/L |
| Vinyl Chloride/Chloroethene | < 5 0 ug/L |
| Xylenes (Total) | < 5 0 ug/L |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6921

Reported to DAVID MOSBY — Date 9/02/92
Affiliation SPFD — Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF WELL FROM ROBERT E BAILEY HOUSEHOLD

Collected by DAVID MOSBY — Date 07/28/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/L |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/L |
| 1,1,2-Trichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethylene | < 5 0 ug/L |
| 1,2-Dichloroethane | < 5 0 ug/L |
| 1,2-Dichloroethene (Total) | < 5 0 ug/L |
| 1,2-Dichloropropane | < 5 0 ug/L |
| 2-Butanone | < 100 ug/L |
| 2-Hexanone | < 50 ug/L |
| 4-Methyl-2-Pentanone | < 50 ug/L |
| Acetone | < 100 ug/L |
| Benzene | < 5 0 ug/L |
| Bromodichloromethane | < 5 0 ug/L |
| Bromoform | < 5 0 ug/L |
| Bromomethane | < 5 0 ug/L |
| Carbon Disulfide | < 5 0 ug/L |
| Carbon Tetrachloride | < 5 0 ug/L |
| Chlorobenzene | < 5 0 ug/L |
| Chloroethane | < 5 0 ug/L |

Page 2
Sample no 92-6921
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 5 0 ug/L |
| Chloromethane | < 5 0 ug/L |
| cis-1,3-Dichloropropene | < 5 0 ug/L |
| Dibromochloromethane | < 5 0 ug/L |
| Ethylbenzene | < 5 0 ug/L |
| Methylene Chloride | < 5 0 ug/L |
| Styrene | < 5 0 ug/L |
| Tetrachloroethene | < 5 0 ug/L |
| Toluene | < 5 0 ug/L |
| trans-1,3-Dichloropropene | < 5 0 ug/L |
| Trichloroethene | < 5 0 ug/L |
| Vinyl Acetate | < 100 ug/L |
| Vinyl Chloride/Chloroethene | < 5 0 ug/L |
| Xylenes (Total) | < 5 0 ug/L |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6922

| | |
|---|---|
| Reported to DAVID MOSBY | Date 9/02/92 |
| Affiliation SPFD | Project Code 3658/3148 |

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF WELL FROM STEVE FERRA HOUSEHOLD

| | |
|---|---|
| Collected by DAVID MOSBY | Date 07/28/92 |
| Affiliation SPFD | |

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/L |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/L |
| 1,1,2-Trichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethylene | < 5 0 ug/L |
| 1,2-Dichloroethane | < 5 0 ug/L |
| 1,2-Dichloroethene (Total) | < 5 0 ug/L |
| 1,2-Dichloropropane | < 5 0 ug/L |
| 2-Butanone | < 100 ug/L |
| 2-Hexanone | < 50 ug/L |
| 4-Methyl-2-Pentanone | < 50 ug/L |
| Acetone | < 100 ug/L |
| Benzene | < 5 0 ug/L |
| Bromodichloromethane | < 5 0 ug/L |
| Bromoform | < 5 0 ug/L |
| Bromomethane | < 5 0 ug/L |
| Carbon Disulfide | < 5 0 ug/L |
| Carbon Tetrachloride | < 5 0 ug/L |
| Chlorobenzene | < 5 0 ug/L |
| Chloroethane | < 5 0 ug/L |

Page 2
Sample no 92-6922
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 5 0 ug/L |
| Chloromethane | < 5 0 ug/L |
| cis-1,3-Dichloropropene | < 5 0 ug/L |
| Dibromochloromethane | < 5 0 ug/L |
| Ethylbenzene | < 5 0 ug/L |
| Methylene Chloride | < 5 0 ug/L |
| Styrene | < 5 0 ug/L |
| Tetrachloroethene | < 5 0 ug/L |
| Toluene | < 5 0 ug/L |
| trans-1,3-Dichloropropene | < 5 0 ug/L |
| Trichloroethene | < 5 0 ug/L |
| Vinyl Acetate | < 100 ug/L |
| Vinyl Chloride/Chloroethene | < 5 0 ug/L |
| ylenes (Total) | < 5 0 ug/L |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6923

Reported to DAVID MOSBY — Date 9/02/92
Affiliation SPFD — Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF SOIL FROM MW #2 FROM 0-3 INCHES DEEP

Collected by DAVID MOSBY — Date 07/28/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/Kg |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/Kg |
| 1,1,2-Trichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethylene | < 5 0 ug/Kg |
| 1,2-Dichloroethane | < 5 0 ug/Kg |
| 1,2-Dichloroethene (Total) | < 5 0 ug/Kg |
| 1,2-Dichloropropane | < 5 0 ug/Kg |
| 2-Butanone | < 100 ug/Kg |
| 2-Hexanone | < 50 ug/Kg |
| 4-Methyl-2-Pentanone | < 50 ug/Kg |
| Acetone | < 100 ug/Kg |
| Benzene | < 5 0 ug/Kg |
| Bromodichloromethane | < 5 0 ug/Kg |
| Bromoform | < 5 0 ug/Kg |
| Bromomethane | < 5 0 ug/Kg |
| Carbon Disulfide | < 5 0 ug/Kg |
| Carbon Tetrachloride | < 5 0 ug/Kg |
| Chlorobenzene | < 5 0 ug/Kg |
| Chloroethane | < 5 0 ug/Kg |

Page 2
Sample no 92-6923
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 5 0 ug/Kg |
| Chloromethane | < 5 0 ug/Kg |
| cis-1,3-Dichloropropene | < 5 0 ug/Kg |
| Dibromochloromethane | < 5 0 ug/Kg |
| Ethylbenzene | < 5 0 ug/Kg |
| Methylene Chloride | < 5 0 ug/Kg |
| Styrene | < 5 0 ug/Kg |
| Tetrachloroethene | < 5 0 ug/Kg |
| Toluene | < 5 0 ug/Kg |
| trans-1,3-Dichloropropene | < 5 0 ug/Kg |
| Trichloroethene | < 5 0 ug/Kg |
| Vinyl Acetate | < 100 ug/Kg |
| Vinyl Chloride/Chloroethene | < 5 0 ug/Kg |
| Xylenes (Total) | < 5 0 ug/Kg |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6924

Reported to DAVID MOSBY — Date 9/02/92
Affiliation SPFD — Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF SOIL FROM MW #2 FROM 5 - 5 5 FT DEEP

Collected by DAVID MOSBY — Date 07/28/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/Kg |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/Kg |
| 1,1,2-Trichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethylene | < 5 0 ug/Kg |
| 1,2-Dichloroethane | < 5 0 ug/Kg |
| 1,2-Dichloroethene (Total) | < 5 0 ug/Kg |
| 1,2-Dichloropropane | < 5 0 ug/Kg |
| 2-Butanone | < 100 ug/Kg |
| 2-Hexanone | < 50 ug/Kg |
| 4-Methyl-2-Pentanone | < 50 ug/Kg |
| Acetone | < 100 ug/Kg |
| Benzene | < 5 0 ug/Kg |
| Bromodichloromethane | < 5 0 ug/Kg |
| Bromoform | < 5 0 ug/Kg |
| Bromomethane | < 5 0 ug/Kg |
| Carbon Disulfide | < 5 0 ug/Kg |
| Carbon Tetrachloride | < 5 0 ug/Kg |
| Chlorobenzene | < 5 0 ug/Kg |
| Chloroethane | < 5 0 ug/Kg |

Page 2
Sample no 92-6924
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 5 0 ug/Kg |
| Chloromethane | < 5 0 ug/Kg |
| cis-1,3-Dichloropropene | < 5 0 ug/Kg |
| Dibromochloromethane | < 5 0 ug/Kg |
| Ethylbenzene | < 5 0 ug/Kg |
| Methylene Chloride | < 5 0 ug/Kg |
| Styrene | < 5 0 ug/Kg |
| Tetrachloroethene | < 5 0 ug/Kg |
| Toluene | < 5 0 ug/Kg |
| trans-1,3-Dichloropropene | < 5 0 ug/Kg |
| Trichloroethene | 6 8 ug/Kg |
| Vinyl Acetate | < 100 ug/Kg |
| Vinyl Chloride/Chloroethene | < 5 0 ug/Kg |
| Xylenes (Total) | < 5 0 ug/Kg |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6925

Reported to DAVID MOSBY — Date 9/02/92
Affiliation SPFD — Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF SOIL FROM BORING FOR MW #2 FROM 10 - 12 FT DEEP

Collected by DAVID MOSBY — Date 07/28/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/Kg |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/Kg |
| 1,1,2-Trichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethylene | < 5 0 ug/Kg |
| 1,2-Dichloroethane | < 5 0 ug/Kg |
| 1,2-Dichloroethene (Total) | < 5 0 ug/Kg |
| 1,2-Dichloropropane | < 5 0 ug/Kg |
| 2-Butanone | < 100 ug/Kg |
| 2-Hexanone | < 50 ug/Kg |
| 4-Methyl-2-Pentanone | < 50 ug/Kg |
| Acetone | < 100 ug/Kg |
| Benzene | < 5 0 ug/Kg |
| Bromodichloromethane | < 5 0 ug/Kg |
| Bromoform | < 5 0 ug/Kg |
| Bromomethane | < 5 0 ug/Kg |
| Carbon Disulfide | < 5 0 ug/Kg |
| Carbon Tetrachloride | < 5 0 ug/Kg |
| Chlorobenzene | < 5 0 ug/Kg |
| Chloroethane | < 5 0 ug/Kg |

Sample no 92-6925
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 5 0 ug/Kg |
| Chloromethane | < 5 0 ug/Kg |
| cis-1,3-Dichloropropene | < 5 0 ug/Kg |
| Dibromochloromethane | < 5 0 ug/Kg |
| Ethylbenzene | < 5 0 ug/Kg |
| Methylene Chloride | < 5 0 ug/Kg |
| Styrene | < 5 0 ug/Kg |
| Tetrachloroethene | < 5 0 ug/Kg |
| Toluene | < 5 0 ug/Kg |
| trans-1,3-Dichloropropene | < 5 0 ug/Kg |
| Trichloroethene | < 5 0 ug/Kg |
| Vinyl Acetate | < 100 ug/Kg |
| Vinyl Chloride/Chloroethene | < 5 0 ug/Kg |
| Xylenes (Total) | < 5 0 ug/Kg |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6926

Reported to DAVID MOSBY — Date 12/30/92
Affiliation SPFD — Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF SOIL FROM BORING FOR MW #2 FROM 15 - 16 FT DEEP

Collected by DAVID MOSBY — Date 07/28/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/Kg |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/Kg |
| 1,1,2-Trichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethylene | < 5 0 ug/Kg |
| 1,2-Dichloroethane | < 5 0 ug/Kg |
| 1,2-Dichloroethene (Total) | < 5 0 ug/Kg |
| 1,2-Dichloropropane | < 5 0 ug/Kg |
| 2-Butanone | < 100 ug/Kg |
| 2-Hexanone | < 50 ug/Kg |
| 4-Methyl-2-Pentanone | < 50 ug/Kg |
| Acetone | < 100 ug/Kg |
| Benzene | < 5 0 ug/Kg |
| Bromodichloromethane | < 5 0 ug/Kg |
| Bromoform | < 5 0 ug/Kg |
| Bromomethane | < 5 0 ug/Kg |
| Carbon Disulfide | < 5 0 ug/Kg |
| Carbon Tetrachloride | < 5 0 ug/Kg |
| Chlorobenzene | < 5 0 ug/Kg |
| Chloroethane | < 5 0 ug/Kg |

Page 2
Sample no 92-6926
Date 12/30/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 5 0 ug/Kg |
| Chloromethane | < 5 0 ug/Kg |
| cis-1,3-Dichloropropene | < 5 0 ug/Kg |
| Dibromochloromethane | < 5 0 ug/Kg |
| Ethylbenzene | < 5 0 ug/Kg |
| Methylene Chloride | < 5 0 ug/Kg |
| Styrene | < 5 0 ug/Kg |
| Tetrachloroethene | < 5 0 ug/Kg |
| Toluene | < 5 0 ug/Kg |
| trans-1,3-Dichloropropene | < 5 0 ug/Kg |
| Trichloroethene | 37 ug/Kg |
| Vinyl Acetate | < 100 ug/Kg |
| Vinyl Chloride/Chloroethene | < 5 0 ug/Kg |
| Xylenes (Total) | < 5 0 ug/Kg |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6927

Reported to DAVID MOSBY — Date 9/02/92
Affiliation SPFD — Project Code 3658/3148

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO
GRAB OF SOIL FROM BORING FOR MW #2 FROM 20 - 22 FT DEEP

Collected by DAVID MOSBY — Date 07/28/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/Kg |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/Kg |
| 1,1,2-Trichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethylene | < 5 0 ug/Kg |
| 1,2-Dichloroethane | < 5 0 ug/Kg |
| 1,2-Dichloroethene (Total) | < 5 0 ug/Kg |
| 1,2-Dichloropropane | < 5 0 ug/Kg |
| 2-Butanone | < 100 ug/Kg |
| 2-Hexanone | < 50 ug/Kg |
| 4-Methyl-2-Pentanone | < 50 ug/Kg |
| Acetone | < 100 ug/Kg |
| Benzene | < 5 0 ug/Kg |
| Bromodichloromethane | < 5 0 ug/Kg |
| Bromoform | < 5 0 ug/Kg |
| Bromomethane | < 5 0 ug/Kg |
| Carbon Disulfide | < 5 0 ug/Kg |
| Carbon Tetrachloride | < 5 0 ug/Kg |
| Chlorobenzene | < 5 0 ug/Kg |
| Chloroethane | < 5 0 ug/Kg |

Page 2
Sample no 92-6927
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 5 0 ug/Kg |
| Chloromethane | < 5 0 ug/Kg |
| cis-1,3-Dichloropropene | < 5 0 ug/Kg |
| Dibromochloromethane | < 5 0 ug/Kg |
| Ethylbenzene | < 5 0 ug/Kg |
| Methylene Chloride | < 5 0 ug/Kg |
| Styrene | < 5 0 ug/Kg |
| Tetrachloroethene | < 5 0 ug/Kg |
| Toluene | < 5 0 ug/Kg |
| trans-1,3-Dichloropropene | < 5 0 ug/Kg |
| Trichloroethene | 7 1 ug/Kg |
| Vinyl Acetate | < 100 ug/Kg |
| Vinyl Chloride/Chloroethene | < 5 0 ug/Kg |
| Xylenes (Total) | < 5 0 ug/Kg |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6928

Reported to DAVID MOSBY — Date 9/02/92
Affiliation SPFD — Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF MW #1

Collected by DAVID MOSBY — Date 07/30/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| TEMPERATURE | 16 9 DEGREES C |
| COMMENTS ANALYZED IN FIELD | |
| pH | 9 8 |
| COMMENTS ANALYZED IN FIELD | |
| SPECIFIC CONDUCTANCE | 219 umhos/cm |
| COMMENTS ANALYZED IN FIELD | |
| 1,1,1-Trichloroethane | < 5 0 ug/L |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/L |
| 1,1,2-Trichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethylene | < 5 0 ug/L |
| 1,2-Dichloroethane | < 5 0 ug/L |
| 1,2-Dichloroethene (Total) | < 5 0 ug/L |
| 1,2-Dichloropropane | < 5 0 ug/L |
| 2-Butanone | < 100 ug/L |
| 2-Hexanone | < 50 ug/L |
| 4-Methyl-2-Pentanone | < 50 ug/L |
| Acetone | < 100 ug/L |

Page 2
Sample no 92-6928
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Benzene | < 5 0 ug/L |
| Bromodichloromethane | < 5 0 ug/L |
| Bromoform | < 5 0 ug/L |
| Bromomethane | < 5 0 ug/L |
| Carbon Disulfide | < 5 0 ug/L |
| Carbon Tetrachloride | < 5 0 ug/L |
| Chlorobenzene | < 5 0 ug/L |
| Chloroethane | < 5 0 ug/L |
| Chloroform | < 5 0 ug/L |
| Chloromethane | < 5 0 ug/L |
| cis-1,3-Dichloropropene | < 5 0 ug/L |
| Dibromochloromethane | < 5 0 ug/L |
| Ethylbenzene | < 5 0 ug/L |
| Methylene Chloride | < 5 0 ug/L |
| Styrene | < 5 0 ug/L |
| Tetrachloroethene | < 5 0 ug/L |
| Toluene | < 5 0 ug/L |
| trans-1,3-Dichloropropene | < 5 0 ug/L |
| Trichloroethene | < 5 0 ug/L |
| Vinyl Acetate | < 100 ug/L |
| Vinyl Chloride/Chloroethene | < 5 0 ug/L |
| Xylenes (Total) | < 5 0 ug/L |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6930

Reported to DAVID MOSBY — Date 9/02/92
Affiliation SPFD — Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , RINSATE BLANK OF PUMP AND HOSE

Collected by DAVID MOSBY — Date 07/30/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/L |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/L |
| 1,1,2-Trichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethylene | < 5 0 ug/L |
| 1,2-Dichloroethane | < 5 0 ug/L |
| 1,2-Dichloroethene (Total) | < 5 0 ug/L |
| 1,2-Dichloropropane | < 5 0 ug/L |
| 2-Butanone | < 100 ug/L |
| 2-Hexanone | < 50 ug/L |
| 4-Methyl-2-Pentanone | < 50 ug/L |
| Acetone | < 100 ug/L |
| Benzene | < 5 0 ug/L |
| Bromodichloromethane | < 5 0 ug/L |
| Bromoform | < 5 0 ug/L |
| Bromomethane | < 5 0 ug/L |
| Carbon Disulfide | < 5 0 ug/L |
| Carbon Tetrachloride | < 5 0 ug/L |
| Chlorobenzene | < 5 0 ug/L |
| Chloroethane | < 5 0 ug/L |
| Chloroform | < 5 0 ug/L |

Page 2
Sample no 92-6930
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Chloromethane | < 5 0 ug/L |
| cis-1,3-Dichloropropene | < 5 0 ug/L |
| Dibromochloromethane | < 5 0 ug/L |
| Ethylbenzene | < 5 0 ug/L |
| Methylene Chloride | < 5 0 ug/L |
| Styrene | < 5 0 ug/L |
| Tetrachloroethene | < 5 0 ug/L |
| Toluene | < 5 0 ug/L |
| trans-1,3-Dichloropropene | < 5 0 ug/L |
| Trichloroethene | < 5 0 ug/L |
| Vinyl Acetate | < 100 ug/L |
| Vinyl Chloride/Chloroethene | < 5 0 ug/L |
| Xylenes (Total) | < 5 0 ug/L |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6931

Reported to DAVID MOSBY — Date 9/02/92
Affiliation SPFD — Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO , GRAB OF MW #2

Collected by DAVID MOSBY — Date 07/31/92
Affiliation SPFD

| PARAMETERS | RESULTS |
|---|---|
| TEMPERATURE | 16 0 DEGREES C |
| COMMENTS ANALYZED IN FIELD | |
| pH | 7 5 |
| COMMENTS ANALYZED IN FIELD | |
| SPECIFIC CONDUCTANCE | 831 umhos/cm |
| COMMENTS ANALYZED IN FIELD | |
| 1,1,1-Trichloroethane | < 5 0 ug/L |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/L |
| 1,1,2-Trichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethane | < 5 0 ug/L |
| 1,1-Dichloroethylene | < 5 0 ug/L |
| 1,2-Dichloroethane | < 5 0 ug/L |
| 1,2-Dichloroethene (Total) | < 5 0 ug/L |
| 1,2-Dichloropropane | < 5 0 ug/L |
| 2-Butanone | < 100 ug/L |
| 2-Hexanone | < 50 ug/L |
| 4-Methyl-2-Pentanone | < 50 ug/L |
| Acetone | < 100 ug/L |

Sample no 92-6931
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Benzene | < 5 0 ug/L |
| Bromodichloromethane | < 5 0 ug/L |
| Bromoform | < 5 0 ug/L |
| Bromomethane | < 5 0 ug/L |
| Carbon Disulfide | < 5 0 ug/L |
| Carbon Tetrachloride | < 5 0 ug/L |
| Chlorobenzene | < 5 0 ug/L |
| Chloroethane | < 5 0 ug/L |
| Chloroform | < 5 0 ug/L |
| Chloromethane | < 5 0 ug/L |
| cis-1,3-Dichloropropene | < 5 0 ug/L |
| Dibromochloromethane | < 5 0 ug/L |
| Ethylbenzene | < 5 0 ug/L |
| Methylene Chloride | < 5 0 ug/L |
| Styrene | < 5 0 ug/L |
| Tetrachloroethene | < 5 0 ug/L |
| Toluene | < 5 0 ug/L |
| trans-1,3-Dichloropropene | < 5 0 ug/L |
| Trichloroethene | < 5 0 ug/L |
| Vinyl Acetate | < 100 ug/L |
| Vinyl Chloride/Chloroethene | < 5 0 ug/L |
| Xylenes (Total) | < 5 0 ug/L |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No 92-6932

Reported to DAVID MOSBY
Affiliation SPFD

Date 9/02/92
Project Code 3658/3000

Sample Description
SUNDSTRAND SITE (MODINE HEAT TRANSFER)
CAMDENTON, MO, GRAB OF SOIL
NEAR BOREHOLE MW #1 FROM O-3 INCHES

Collected by DAVID MOSBY
Affiliation SPFD

Date 07/31/92

| PARAMETERS | RESULTS |
|---|---|
| 1,1,1-Trichloroethane | < 5 0 ug/Kg |
| 1,1,2,2-Tetrachloroethane | < 5 0 ug/Kg |
| 1,1,2-Trichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethane | < 5 0 ug/Kg |
| 1,1-Dichloroethylene | < 5 0 ug/Kg |
| 1,2-Dichloroethane | < 5 0 ug/Kg |
| 1,2-Dichloroethene (Total) | < 5 0 ug/Kg |
| 1,2-Dichloropropane | < 5 0 ug/Kg |
| 2-Butanone | < 100 ug/Kg |
| 2-Hexanone | < 50 ug/Kg |
| 4-Methyl-2-Pentanone | < 50 ug/Kg |
| Acetone | < 100 ug/Kg |
| Benzene | < 5 0 ug/Kg |
| Bromodichloromethane | < 5 0 ug/Kg |
| Bromoform | < 5 0 ug/Kg |
| Bromomethane | < 5 0 ug/Kg |
| Carbon Disulfide | < 5 0 ug/Kg |
| Carbon Tetrachloride | < 5 0 ug/Kg |
| Chlorobenzene | < 5 0 ug/Kg |
| Chloroethane | < 5 0 ug/Kg |

Page 2
Sample no 92-6932
Date 9/02/92

| PARAMETERS | RESULTS |
|---|---|
| Chloroform | < 5 0 ug/Kg |
| Chloromethane | < 5 0 ug/Kg |
| cis-1,3-Dichloropropene | < 5 0 ug/Kg |
| Dibromochloromethane | < 5 0 ug/Kg |
| Ethylbenzene | < 5 0 ug/Kg |
| Methylene Chloride | < 5 0 ug/Kg |
| Styrene | < 5 0 ug/Kg |
| Tetrachloroethene | < 5 0 ug/Kg |
| Toluene | < 5 0 ug/Kg |
| trans-1,3-Dichloropropene | < 5 0 ug/Kg |
| Trichloroethene | < 5 0 ug/Kg |
| Vinyl Acetate | < 100 ug/Kg |
| Vinyl Chloride/Chloroethene | < 5 0 ug/Kg |
| Xylenes (Total) | < 5 0 ug/Kg |

COMMENTS Analyzed by GC/MS at Continental Analytical Services, Inc

Former Hulett Lagoon Site
Combined PA/SI
Reference 37

STATE OF MISSOURI

M I( h G Sι ı h M M hf d Dı cto

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

PO Box 176 Jefferson City MO 65102 0176

## MEMORANDUM

DATE September 8, 1998

TO Gary Behrns Chief
Superfund Section Hazardous Waste Program

FROM Arthur H Groner Chief
Permits Section Hazardous Waste Program

SUBJECT Former Hulett Lagoon Camdenton Missouri

The Hazardous Waste Program Permits Section is referring the former Hulett Lagoon in Camdenton, Missouri, to the Hazardous Waste Program Superfund Section The Hulett Lagoon was operated by the City of Camdenton from 1961 to 1988 The City of Camdenton is the current owner of the property The lagoon is located on the east side of Dawson Road and is approximately 1/4 mile northeast of Modine Manufacturing Company (Modine) It received process wastewater from Modine s predecessors Dawson Metal Products from 1967 to 1972 and Sundstrand Tubular Products from 1972 to 1986 Wastewater from the facility contained volatile organic compounds (VOCs) cyanide and various metals In addition to receiving wastewater from the facility the lagoon also received domestic sewage from the surrounding residences A dye trace study of the City of Camdenton's sewer system performed by the Division of Geology and Land Survey (DGLS) on August 5, 1998, verified that facility wastewater mixes with domestic sewage prior to entering city property Therefore the domestic sewage exemption of 40 CFR 261 4 most likely applied during the facility s operating discharges

Closure of the Hulett Lagoon was completed in 1988 by the City of Camdenton pursuant to an Industrial Development Grant overseen by the Missouri Department of Natural Resources Water Pollution Control Program (WPCP) Sampling and analysis of the sludge was limited to metals and total solids High levels of chromium lead and nickel were detected in the sludge The sludge from the lagoon was removed and applied on

the runways at the municipal airport The lagoon berms were turned in and mixed with the surrounding soil The domestic sewage exemption of 40 CFR 261 4 may have applied to the wastewater discharge but is not applicable to the sludges applied on the airport runways The lagoon closure was not designed to meet the substantive requirements of the Hazardous Waste Management Law relative to corrective action At the time of closure no sampling and analysis for VOCs or cyanide were performed, and the horizontal and vertical extent and rate of migration of contamination in environmental media associated with the lagoon were not determined during the 1988 lagoon closure process Hence, the sludge sampling performed was not sufficient for RCRA determinations

Modine has four on-site groundwater monitoring wells and one off-site well located at the southwest edge of the Hulett Lagoon Based on potentiometric maps and a bedrock fracture system study, prepared by Dames & Moore consultants for Modine, the groundwater flow direction is to the southwest Sampling results from one of the on-site wells (MW-4) and the off-site well (MW-5) have shown levels of trichloroethene (TCE) at 173 parts per billion (ppb) and 484 ppb, respectively The Environmental Services Program (ESP) sampled a residential well on April 23 1998 located across the street from the facility and down gradient of monitoring well MW-5 TCE was detected in this well at 210 ppb

TCE was also detected in the City of Camdenton's Mulberry Well as high as 6 3 ppb, which is above the EPA Maximum Contaminant Level (MCL) of 5 ppb The Mulberry Well is located approximately 1/4 mile east of Modine and ½ mile southeast of the Hulett Lagoon The Mulberry Well was the city s highest volume producing well The well is drilled to a total depth of 900 ft below ground surface (bgs) and has a maximum pumping rate of 600 gallons per minute (gpm) The city has taken the Mulberry Well off line and is in the process of drilling a new well

The city has been monitoring the Mulberry Well monthly and the two remaining municipal wells quarterly since February 1998 The two remaining wells have been non detect for TCE and all other constituents During the last sampling event the city sampled a residential well located southwest of the municipal airport TCE was detected in this well at 13 1 ppb Current speculation is that the contamination in this well may have been caused by the application of sludge from the Hulett Lagoon on the airport runways

Due to the close proximity of the Hulett Lagoon and Modine Manufacturing Company and the nature of the groundwater contamination close coordination between the Superfund Section, the Permits Section the Enforcement Section Public Drinking Water Program Jefferson City Regional Office, and the Division of Geology and Land

Survey will be necessary If you have any questions or require additional information regarding this matter, please contact Chris Kump, of my staff, at 751-3068

AHG ckm

c Lyle Crocker, HWP-Enforcement Section
Robert Hentges, JCRO
Cindy Kemper HWP-Director s Office
Ed Knight, WPCP
Terry Timmons PDWP
Diana Travis DGLS
Shelley Woods AGO

bc Chnstine Kump, HWP
John Jurgensmeyer HWP

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
PO Box 176 Jefferson City MO 65102 0176

**MEMORANDUM**

DATE March 24 1999

TO Gary Behrns Chief
Superfund Section, Hazardous Waste Program

THROUGH Arthur H Groner Chief
Permits Section Hazardous Waste Program

FROM Christine M Kump Environmental Engineer
Permits Section Hazardous Waste Program

SUBJECT Clarification on Referral Memo - Former Hulett Lagoon Camdenton Missouri

Valerie Wilder, Environmental Specialist, Superfund Section requested I clarify a sentence located in paragraph two of the referral memo sent to you dated September 8 1998 (please see attached letter)

The sentence Ms Wilder requested clarification on reads "The domestic sewage exemption of 40 CFR 261 4 may have applied to the wastewater discharge but is not applicable to the sludges applied on the runways " In consultation with Shelley Woods AGO and other members of the corrective action team prior to writing the referral memo we concluded that Superfund's CERCLA authority would be more inclusive and have stronger support to require action should hazardous constituents be found at or near the runway The corrective action team felt CERCLA's authority would be more defensible in litigation since CERCLA is authorized to pursue hazardous constituents regardless of whether the waste was or is an exempt RCRA hazardous waste

CMK sw

Attachment

# Combined Preliminary Assessment/Site Inspection Sampling Report

## Former Hulett Lagoon Site
## Camdenton, Missouri
## Camden County

## Field Activities Conducted
## January 6-7, 1999
## January 21, 1999

Prepared For:

Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

Prepared By:

Missouri Department of Natural Resources
Division of Environmental Quality
Environmental Services Program

## Table of Contents

## 1.0 Introduction

As authorized under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986, the Missouri Department of Natural Resources (MDNR), Hazardous Waste Program (HWP), Site Evaluation Unit is conducting a combined preliminary assessment/site inspection (PA/SI) on the Former Hulett Lagoon site. The MDNR, HWP requested the MDNR, Environmental Services Program (ESP) prepare and implement a sampling plan as part of the combined PA/SI.

Initially, the Former Hulett Lagoon site consisted of two separate areas of concern. After field activities associated with both areas were complete, HWP personnel requested the site be split into two separate sites, each with its own sampling report. This report covers field activities conducted in association with the actual former Hulett lagoon. A separate report has been prepared which covers field activities associated with the newly established "Camdenton Sludge Disposal Area" site.

Field activities were conducted throughout the month of January. Initial groundwater sampling was conducted on January 6-7, 1999. A soil sampling investigation was conducted on January 21, 1999. ESP personnel involved with the various field activities included Environmental Specialists Brian Allen, Ken Hannon, and Doug Thompson. HWP Environmental Specialist Valerie Wilder was present during all field activities conducted. Information learned from field observations and sampling will be used by the HWP in scoring the site's potential as a hazardous waste site under the CERCLA Hazard Ranking System.

## 2.0 Site Information

### 2.1 Location

The Former Hulett Lagoon site is located just east of Dawson Road in Camdenton, MO, approximately ¼ mile northeast of the Modine Manufacturing Company facility. The legal description of the former lagoon is SW ¼ SW ¼ SW ¼ sec. 24, T. 38 N., R. 17 W.

### 2.2 Description

The Former Hulett Lagoon site is on property owned by the City of Camdenton. The former lagoon is located in a mixed residential/industrial area. The lagoon, closed since 1989, has been vegetated and is generally flat with remnants of the former berm still visible. Surface runoff from this area flows to the northwest and enters a nearby intermittent drainage that travels to the west.

## 2.3 History/Contaminants of Concern

The former Hulett lagoon was one of five lagoons operated by the City of Camdenton prior to the construction of a municipal wastewater treatment plant. The lagoon was in operation from 1961 until approximately 1988, when the City of Camdenton began closure. In addition to municipal wastes, the Hulett lagoon also received wastes generated from a nearby manufacturing facility (discussed below).

In 1967, Dawson Metal Products built a manufacturing facility located approximately ¼ mile southwest of the Hulett lagoon and began operations. Sundstrand Tubular Products purchased the facility in 1972 and continued operations until 1990, when it was purchased by Modine Heat Transfer, Inc., a wholly owned subsidiary of Modine Manufacturing Company. Modine Manufacturing Company currently owns and operates the facility.

From 1967 to the present, manufacturing operations at this facility have consisted of producing air conditioning coils and feeder parts from aluminum and copper tubing, which have included electroplating and the use of solvents. Prior to the construction of the municipal wastewater treatment plant or any facility pretreatment processes, wastes generated from the facility were discharged, in part at least, to the nearby Hulett lagoon.

The primary contaminants of concern at the site include metals and solvents associated with the manufacturing processes from this facility. Specific metals of concern include copper, chromium, lead, and nickel. Various solvents have been used at the facility, including the primary contaminant of concern for this investigation, trichloroethene (TCE). TCE was reportedly used beginning in the early 1970s and continuing to December 1990. It is likely TCE wastes generated at the facility would have been present in the wastestream discharged to the Hulett lagoon.

As part of the Hulett lagoon closure, the city received approval from MDNR to land apply lagoon sludge to an area immediately south of the Camdenton Airport runway currently identified by the MDNR as the Camdenton Sludge Disposal Area site. Information indicates sampling of the sludge was apparently limited to determining the levels of metals prior to approving the disposal method and that no analyses were conducted for the presence of any volatile organic compounds The lagoon closure was completed in 1989

A preliminary assessment and site inspection were conducted of the manufacturing facility property in 1992, which did not include any off-site investigations of the former lagoon or sludge disposal area. Investigations at that time confirmed the presence of chlorinated solvents, including TCE, in the soils and groundwater. Contamination at the facility is likely a result of historic waste handling practices and spills.

The facility is currently negotiating a Corrective Action Abatement Order on Consent through the Resource Conservation and Recovery Act (RCRA) Unit of the MDNR, HWP. As a result of a specific RCRA exclusion, the current and future RCRA work at the manufacturing facility will not include any investigation of or relating to the former lagoon. Investigation of the former lagoon and sludge disposal area must be conducted under CERCLA authority

In March 1993, 2.1 parts per billion (ppb) TCE were detected in a City of Camdenton municipal well, known as the Mulberry Well, which is located near the manufacturing facility. TCE has consistently been detected in this municipal well since 1997 at levels reaching a high of 11.8 ppb. At least one private well, located directly north of the facility, has been shown to contain TCE at 210 ppb.

The MDNR, HWP has extensive file information on the manufacturing facility and the lagoon closure, which should be referenced for a more comprehensive review of historic regulatory activities.

## 3.0 Methods

### 3.1 General Field Procedures

A health and safety briefing was conducted on-site and personnel read and signed the site-specific health and safety plan prior to initiating field activities.

Missouri One-Call was notified of proposed field activities prior to ESP personnel arriving on-site, and all applicable underground utilities marked.

Field instruments. including a photoionization detector (PID), pH, specific conductivity, and temperature meters were calibrated on-site following manufacturers' specifications.

ESP personnel employed established standard operating procedures for the collection of various samples. Containers for each sample were filled based upon the volatility of the analytes of concern with the most volatile analytes being collected first. All samples were collected in certified-clean containers and preserved in the field as appropriate.

ESP personnel collected depth-discrete soil grab samples in selected source areas and groundwater samples from selected private wells, municipal/public wells, and monitoring wells in an effort to determine the types of hazardous wastes which may be present, whether a hazardous substance release has occurred to the environment, and whether the substances have impacted, or may impact, human health and/or the environment. Background samples were also collected of each media sampled from areas that would not appear to be impacted from the site.

An ESP global positioning system (GPS) unit was taken to the field and used to determine the geographic coordinates of each sample location. All sample locations and descriptions were noted in a bound field logbook and locations noted on a site map.

### 3.2 Groundwater Sampling

Specific conductivity, pH, and temperature were determined for each sample at the time of collection. In addition, turbidity was determined on each sample collected from monitoring wells that was submitted for metals analyses. Personnel attempted to gain pertinent information on each well sampled (age, construction, depth, casing length, screened interval, location of tap, etc.) and record such into the field logbook.

Groundwater grab samples were collected of the City of Camdenton's Mulberry and Blair municipal wells, monitoring wells located on the current Modine Manufacturing Company facility and adjacent to the former lagoon, a private well located immediately north of the facility, and a private well considered to be located downgradient of the former lagoon area.

#### 3.2.1 Residential well/Municipal well samples

In general, samples were collected from taps nearest the well heads after opening the tap at a high flow for approximately five minutes. Sample containers were then filled directly from the taps at a low flow.

#### 3.2.2 Monitoring well samples

Samples were collected by first laying clean plastic sheeting on the ground around each well casing. Personnel then accessed each well and determined the total depth (or referred to well logs) and depth to water, then calculated one well volume. A clean or field decontaminated 2-inch submersible pump using clean food-grade polyethylene tubing or a clean, disposable Teflon® or polyethylene bailer, with clean rope, were used to evacuate one well volume (at a low flow if the pump was used). Personnel determined water quality parameters (pH. specific conductivity, and temperature) and evacuation continued until one of three criteria was met: 1) water quality parameters stabilized (pH within 0.1 units, temperature and specific conductivity within 10%) between two consecutive evacuations; 2) three well volumes were removed; or, 3) the well was evacuated dry.

In the event the well was determined to be going dry, a grab sample was collected as soon as the well had recharged sufficiently. Otherwise, once evacuation was complete, the sample was collected by gently lowering a bailer to the bottom of the well and retrieving water back to the surface. A clean, disposable, volatile organic compound (VOC) bottom-emptying device was used to transfer water directly to sample containers.

### 3.3 Soil Sampling

A membrane interface probe (MIP) was employed to generate soil gas data of the subsurface within and surrounding the boundaries of the former lagoon area. The soil gas data was used, in part, to determine actual sampling locations.

Soil grab samples were collected from discrete depths utilizing a track-mounted hydraulic soil probe. Clean disposable acetate liners were used in conjunction with the soil probe and inserted into stainless steel macro core samplers fitted with clean cutting shoes. The core samplers were advanced to the desired sampling depth via push tubes and the samplers and soil retrieved. The acetate liners were removed and cut open exposing the soil. Personnel immediately collected soils to be submitted for volatile organics analyses with clean EnCore® sampling devices (two 5gm aliquots). An additional aliquot for volatile organics analyses was collected in a 2-oz glass jar, as a backup. Soils to be submitted for the additional analytes of concern were transferred with clean stainless steel spoons to clean aluminum foil pans, homogenized, then placed into appropriate sample containers.

### 3.4 Sample Quantity

A total of nine soil grab samples and 13 water grab samples were collected during field activities associated with the Former Hulett Lagoon site and submitted to the ESP laboratory for analyses. These sample numbers include quality assurance/quality control samples. Refer to Table 1 for a listing of all samples collected.

### 3.5 Analyses Requested

Based on the history of the site and HWP data needs, the following analyses were requested. All water grab samples and soil grab samples were submitted for volatile organics and total metals (As, Ba, Cr, Cd, Cu, Pb, Ni, Hg, Se, Ag) analyses. Water grab samples of monitoring wells were also submitted for dissolved metals (same metals as above) analyses. Instructions were relayed to analytical personnel that if a sample's total analyte results were 80% of twenty times the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit, TCLP analysis was to be performed on that sample. Additionally, drinking water detection limits were requested for the public and private well samples, as well as any monitoring well samples, where no contaminants were observed above the standard practical quantitation limits.

### 3.6 Chain of Custody

All samples received a numbered label and the corresponding number was entered onto a chain of custody form indicating the location, date and time of collection, and analytes requested. Samples were stored and transported on ice in coolers. ESP field personnel maintained custody of the samples until relinquishing them to a sample custodian at the state's environmental laboratory within the Environmental Services Program in Jefferson City for analyses.

## 4.0 Data Quality

To help ensure precise, accurate, representative, complete, and comparable data were achieved, all field work and analyses were conducted in accordance with the Fiscal Year 1999 Quality Assurance Project Plan for Pre-Remedial Site Assessments dated August 14, 1998. Unless otherwise noted, ESP field personnel utilized standard operating procedures established within the ESP, Field Services Section for all samples collected.

### 4.1 Field Methods

Clean disposable nitrile gloves were worn by sampling personnel and clean equipment utilized for each separate sample collected to minimize the possibility of cross-contamination.

Field personnel noted all observations, sample locations, descriptions, and methods in a bound field logbook.

### 4.2 Field Decontamination

Field decontamination of sampling equipment was not required during the sampling event.

### 4.3 Quality Assurance/Quality Control Samples

#### 4.3.1 Trip blank

One trip blank was submitted for the sampling event. The trip blank was taken to the field and accompanied water grab samples collected and transported back to the ESP laboratory. The trip blank received a numbered label, was entered onto the chain-of-custody form, and submitted for volatile organics analyses.

#### 4.3.2 Duplicate samples (waters)

Two duplicate water grab samples were collected/submitted for the sampling event. The duplicate samples were collected at the same location and time as their respective true samples, using similar technique and equipment. Each duplicate sample received a numbered label, was entered onto the chain-of-custody form, and submitted for the same analytes as their respective true samples.

#### 4.3.3 Replicate sample (soil)

One replicate soil grab sample was collected/submitted for the sampling event. The replicate sample was collected by dividing the true sample evenly into two separate samples and submitting each for laboratory analyses. The portion of each true/replicate sample pair submitted for volatile organics was not homogenized prior to collection. The remaining soil was homogenized prior to splitting the true sample into two samples. The replicate sample received a numbered label, was entered onto the chain-of-custody form, and submitted for the same analytes as its true sample.

## 5.0 Investigation Derived Wastes (IDW)

Efforts were made to minimize IDW generation. IDW included soil, aqueous liquids (groundwater), disposable sampling equipment, and disposable personal protective equipment (PPE).

Field personnel returned unused soils to their source immediately after generation. IDW generated during private and public well evacuation was discharged to the ground. IDW generated during monitoring well evacuations was containerized and discharged to the Modine Manufacturing Company's pretreatment wastewater system. Disposable PPE and disposable sampling equipment were handled as solid waste, containerized, and properly disposed.

## 6.0 Observations

### 6.1 General

A significant snow event occurred on January 2, 1999. As a result of the snow-cover diminishing ground visibility and equipment access, field activities conducted on January 6-7, 1999, were limited to the collection of groundwater samples only. The weather on January 6, 1999, was sunny and approximately 30 degrees Fahrenheit with winds light and variable. The weather on January 7, 1999, was overcast and approximately 10 degrees Fahrenheit with winds light and variable.

Personnel returned to the site on January 21, 1999, once snow had melted, to conduct the soil/source investigation and sampling. The weather on January 21, 1999, was overcast and ranged from 40 to 45 degrees Fahrenheit with winds light and variable Light, intermittent rains occurred throughout the day.

GPS coordinates of all sampling points were post-processed at ESP and entered onto a map of the site. Refer to Table 2 for a listing of all sampling point coordinates and Appendix A for the locations of all samples collected.

### 6.2 Groundwater Sampling

As to not interfere with any planned investigations under the RCRA Corrective Action Abatement Order, work conducted on the Modine Manufacturing facility property was limited to collecting groundwater samples from monitoring wells located on the facility property (no soil investigations were conducted on the Modine Manufacturing property).

Personnel were required to make adjustments to the monitoring well sampling procedures due to the considerable depths of the monitoring wells (depths ranged from 161 to 197 feet) and well diameters. Due to the significant well depths, personnel were not able to accurately field-determine the depth of each well and, instead, relied upon well logs to determine the total depths

of several wells. As a result of the considerable well volumes associated with the 4-inch monitoring wells, personnel recorded water quality parameters at timed intervals, instead of after each well volume, to determine when the parameters were stable and acceptable to collect a sample. This procedure minimized the volume of evacuation water which was generated. Personnel ensured water quality parameters had stabilized in each well prior to sample collection.

An obstruction in the well casing was encountered in monitoring well (MW-) 2, a two-inch well installed by MDNR, at the approximate 150 foot depth, which did not allow personnel to extend the submersible pump to the screened depth for evacuation. Personnel were able to reach the bottom of the well with a clean, disposable bailer and clean rope, which was used to complete evacuation and sampling.

With HWP personnel's knowledge and permission, ESP collected two grab samples for volatile organics analyses from MW-4 to tentatively compare the effects varying collection methods have on analytical results. One sample (991461) was collected using the submersible pump and the second sample (991462) was collected using a bailer. There were no apparent significant discrepancies noted in the analytical results of the two samples that could be attributed to the collection methods.

MW-3 was evacuated dry after approximately 20 gallons were removed (1 well volume was calculated to be 11 gallons). Therefore, the well was allowed to recharge sufficiently, and the grab sample was collected with a bailer.

ESP personnel collected two sets of 40-ml vials for volatile organics analyses on all water grab samples collected on January 6-7, 1999. The first set of vials in each sample was submitted for volatile organics analyses using the standard practical quantitation limits for water samples (as specified in the QAPP). Per a request from HWP, in the event contaminant levels in a given sample were low enough, the second set of vials was analyzed to realize the lower drinking water detection limits.

All samples collected from public and private wells were noted to be clear and colorless. The descriptions of samples collected from monitoring wells were noted as follows (turbidity was determined in the field and is reported in nephelometric units (NTUs)). There were no separate, free-phase liquids noted in any of the water grab samples.

| | |
|---|---|
| MW-1 | Slightly cloudy (143 NTUs) and light white in color. |
| MW-2 | Cloudy (372 NTUs) and light white in color. |
| MW-3 | Cloudy (951 NTUs) and light reddish-brown in color. |
| MW-4 | Slightly cloudy (86.6 NTUs) and light brown in color. |
| MW-5 | Cloudy (456 NTUs) and transparent white in color. |

Refer to Table 3 for monitoring well information.

**6.3 Soil Sampling**

During the MIP investigation and soil sampling, personnel generally encountered refusal at depths ranging from five to six feet at the former lagoon. A total of ten MIP borings were performed in and around the former lagoon during the field activities. Samples were collected from specific MIP locations based upon the soil gas data generated and the boring locations relative to the areas of concern. Soil samples collected were generally noted to consist of reddish-brown cherty clays with varying amounts of gravel interspersed. Due to the nature of the matrix, sample homogenization was difficult.

Personnel unsuccessfully attempted to collect depth-discrete sediment/soil samples of the intermittent drainage which receives surface drainage from the former lagoon area (as proposed in the sampling plan). Due to the gravel/rock matrix of the drainage bed, no adequate samples could be collected.

Refer to Appendix B for the MIP data logs generated for each boring and the site map for the MIP boring and soil sampling locations. The logs indicate detections noted on the MIP's PID, identified as "Detector 1" and the flame ionization detector "Detector 2".

**7.0 Analytical Results**

The analytical results of samples collected are attached as Appendix C.

Submitted by:

Brian J. Allen
Environmental Specialist
Superfund/RCRA Unit
Environmental Services Program

Date: 3/12/99

Approved by:

James H. Long
Director
Environmental Services Program

JHL:bac

c: Valerie Wilder, Environmental Specialist, HWP
Robert Hentges, Regional Director, JCRO

TABLES
Former Hulett Lagoon Site
Camdenton, Missouri

Table 1
Former Hulett Lagoon Site
Sample Listing

| Sample # | Sample Media/Type | Location Collected | Date/Time Collected |
|---|---|---|---|
| 991450 | QA/QC sample (Trip blank) | ESP laboratory | 1/5/99 |
| 991451 | Water grab | Paul Buckwalter residential well (Box 45A Normac Estates, Camdenton, MO), located apparently downgradient of the former Hulett Lagoon approximately 2 miles Sample collected after approximately 5 minutes evacuation | 1/6/99 @ 1025 |
| 991452 | Water grab | Dave Burnau residential well (178 Sunset Drive, Camdenton, MO), located directly north (across the street) of Modine Manufacturing Sample collected after approximately 5 minutes evacuation time. | 1/6/99 @ 1105 |
| 991453 | QA/QC sample (Duplicate) | Duplicate sample of 991452 | 1/6/99 @ 1105 |
| 991458 | Water grab | City of Camdenton municipal well #4 (AKA "Blair" well) Sample collected after approximately 5 minutes evacuation time | 1/6/99 @ 1305 |
| 991459 | Water grab | City of Camdenton municipal well known as the "Mulberry" well Sample collected after approximately 5 minutes evacuation time | 1/6/99 @ 1325 |
| 991460 | Water grab | Monitoring well (MW-) 3, located on the south edge of the Modine Manufacturing facility lot, southwest of the facility building | 1/6/99 @ 1530 |
| 991461 | Water grab | MW-4, located at the main entrance to Modine Manufacturing All sample analytes collected using a submersible pump. | 1/6/99 @ 1650 |
| 991462 | Water grab | MW-4. Sample submitted for volatile organics analyses and collected with a bailer. Sample was collected to compare results with 991461 analytical results for volatile organics. | 1/6/99 @ 1720 |
| 991463 | Water grab | MW-2, located on the northeast side of the Modine Manufacturing facility building Sample was collected with a bailer. | 1/7/99 @ 0940 |
| 991464 | Water grab | MW-1, located in the western gravel parking lot of the Modine Manufacturing facility property. Sample was collected with a bailer. | 1/7/99 @ 1100 |
| 991465 | Water grab | MW-5, located adjacent, southwest edge, of the former Hulett Lagoon. Sample was collected with a bailer. | 1/7/99 @ 1230 |
| 991466 | QA/QC sample (Duplicate) | Duplicate sample of 991465. | 1/7/99 @ 1230 |
| 991467 | Soil grab | Boring "Hulett-03", collected from the 3-4 ft depth. | 1/21/99 @ 1030 |
| 991468 | Soil grab | Boring "Hulett-03", collected from the 4.5-5.5 ft depth. | 1/21/99 @ 1045 |
| 991469 | Soil grab | Boring "Hulett-01", collected from the 4 5-5 ft depth | 1/21/99 @ 1135 |
| 991470 | Soil grab | Boring "Hulett-02", collected from the 6 5-7 ft depth. | 1/21/99 @ 1205 |
| 991471 | Soil grab | Boring "Hulett-04", collected from the 7.5-8 ft depth. | 1/21/99 @ 1355 |
| 991472 | Soil grab | Boring "Hulett-07", collected from the 5.5-6 ft depth. | 1/21/99 @ 1450 |
| 991473 | Soil grab | Boring "Hulett-09", collected from the 6-7 ft depth | 1/21/99 @ 1605 |
| 991474 | QA/QC sample (Replicate) | Replicate sample of 991473 | 1/21/99 @ 1605 |
| 991475 | Soil grab | Boring "Hulett-10", collected from the 10 5-11 ft depth | 1/21/99 @ 1630 |

Table 2
Former Hulett Lagoon Site
GPS Data Points

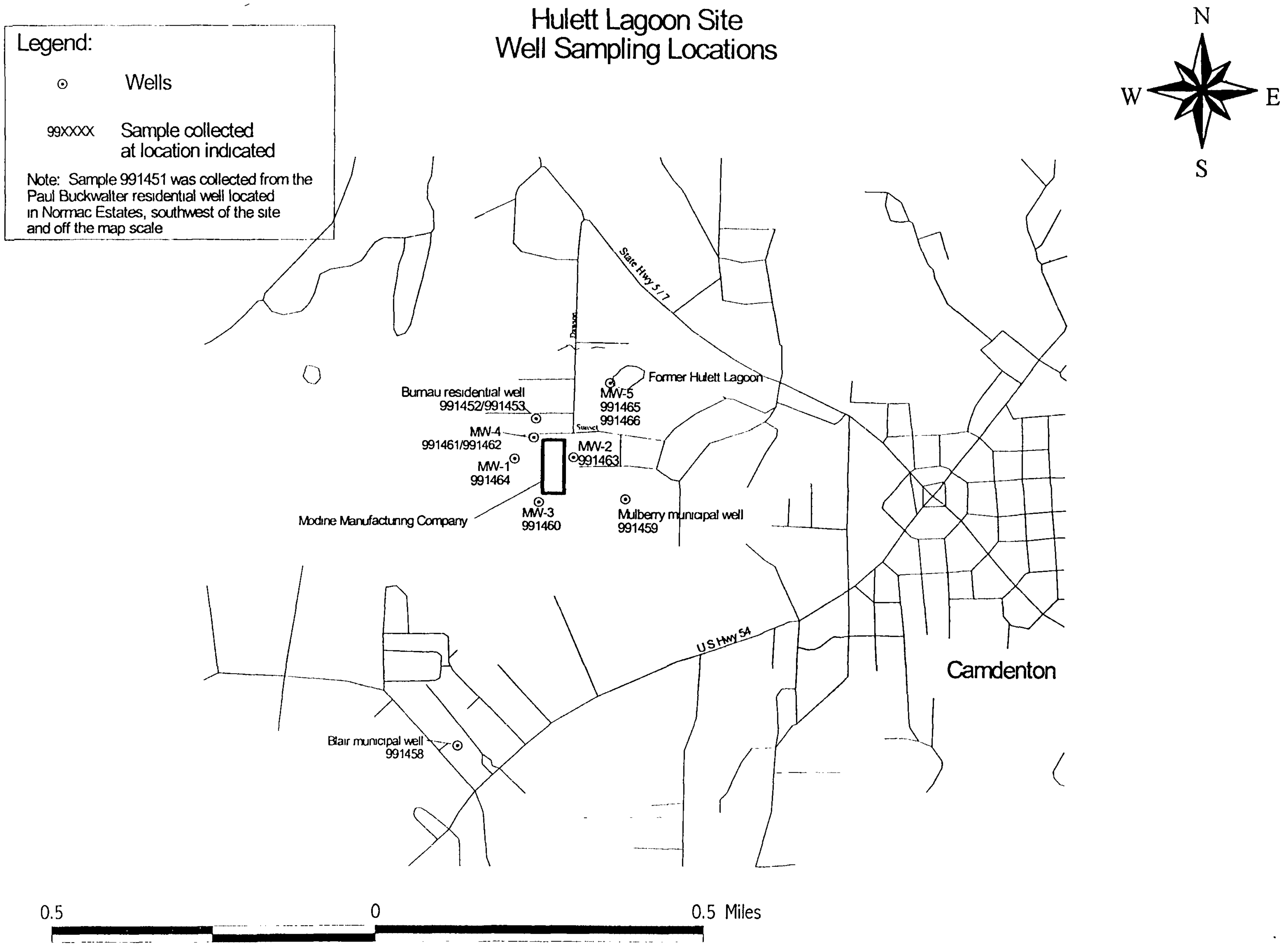
| GPS Identification | Location/ Description | Latitude (Degrees N) | Longitude (Degrees W) | ArcView Data Points (UTM) | |
|---|---|---|---|---|---|
| | | | | Easting | Northing |
| A010619A | "Blair" municipal well | +38 001726° | -92.760299° | 521045 | 4206034 |
| A010619B | "Mulberry" municipal well | +38.008235° | -92.754798° | 521526 | 4206757 |
| A010620A | MW-3 Modine Mfr. | +38.008161° | -92.757634° | 521277 | 4206748 |
| A010623A | MW-4 Modine Mfr. | +38 009836° | -92.757792° | 521262 | 4206934 |
| A010714A | MW-2 Modine Mfr. | +38.009324° | -92.756490° | 521377 | 4206877 |
| A010716A | MW-1 Modine Mfr | +38.009287° | -92 758428° | 521207 | 4206873 |
| A010717A | MW-5 Former lagoon | +38.011261° | -92.755284° | 521482 | 4207093 |
| A010617A | Burnau residential well | +38 010320° | -92.757711° | 521269 | 4206988 |
| A010519A | Buckwalter residential well | +38 000833° | -92.786944° | 521269 | 4206988 |
| A012115A | Boring "Hulett 01" | +38 011315° | -92 755011° | 521506 | 4207099 |
| A012115B | Boring "Hulett 02" | +38.011403° | -92 754850° | 521520 | 4207109 |
| A012116A | Boring "Hulett 03" | +38.011508° | -92 754867° | 521519 | 4207120 |
| A012119A | Boring "Hulett 04" | +38.011421° | -92.754655° | 521496 | 4207096 |
| A012120A | Boring "Hulett 05" | +38.011291° | -92.755130° | 521495 | 4207109 |
| A012120B | Boring "Hulett 06" | +38 011406° | -92.755135° | 521505 | 4207120 |
| A012120C | Boring "Hulett 07" | +38 011507° | -92.755024° | 521487 | 4207123 |
| A012120D | Boring "Hulett 08" | +38.011531° | -92.755222° | 521481 | 4207106 |
| A012121A | Boring "Hulett 09" | +38 010986° | -92 754827° | 521537 | 4207111 |
| A012122A | Boring "Hulett 10" | +38 011379° | -92 755299° | 521522 | 4207062 |

Table 3
Former Hulett Lagoon Site
Monitoring Well Data

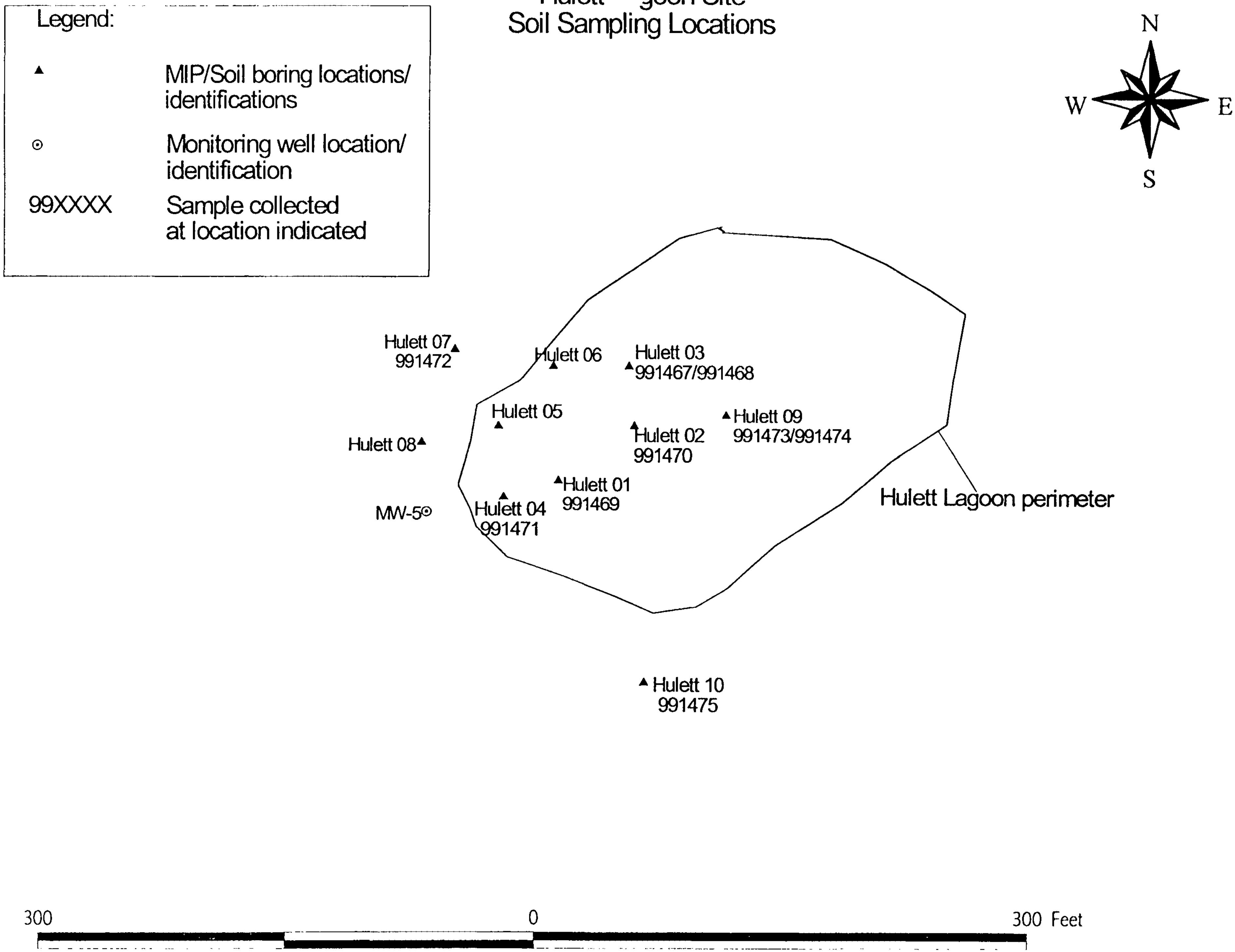
| Well Identification | Diameter (inches)/ Riser construction | Total well depth (feet) from TOC | Depth to water (feet) from TOC | Water column (feet) | One well volume (gallons) |
|---|---|---|---|---|---|
| MW-1 | 2" PVC | 161' (per well log) | 153.22 | 7.78 | 1.2 |
| MW-2 | 2" PVC | 197' (per well log) | 165.72 | 31.28 | 5.1 |
| MW-3 | 4" Metal | 170' (per well log) | 153.12 | 16.88 | 11 |
| MW-4 | 4" Metal | 194.3' (per well log) | 158.55 | 35.75 | 23.3 |
| MW-5 | 2" PVC | 120.4' (field determined) | 102.75 | 17.65 | 2.8 |

APPENDIX A
Site Maps
Former Hulett Lagoon Site
Camdenton, Missouri

# Hulett Lagoon Site
## Well Sampling Locations

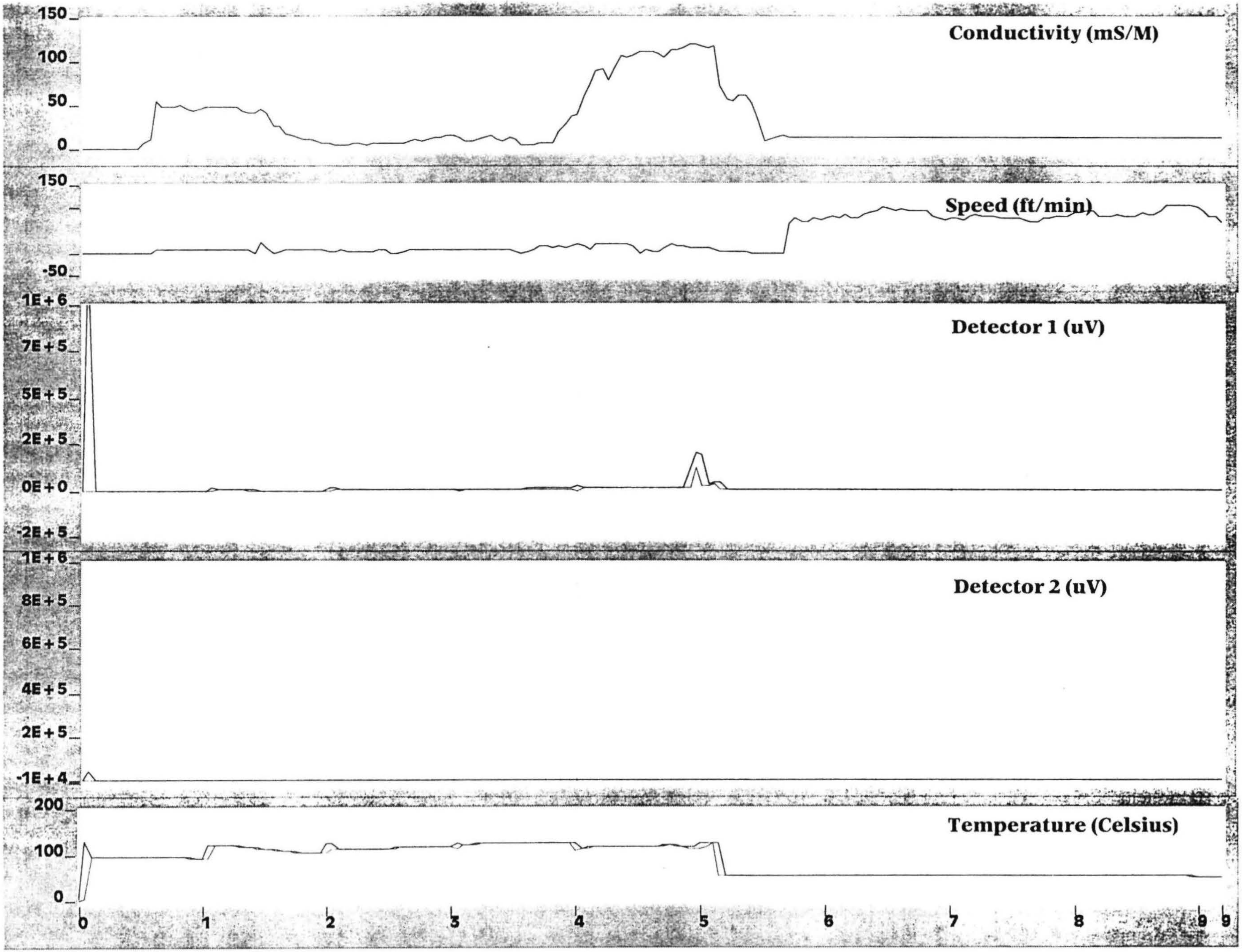


# Hulett goon Site
# Soil Sampling Locations

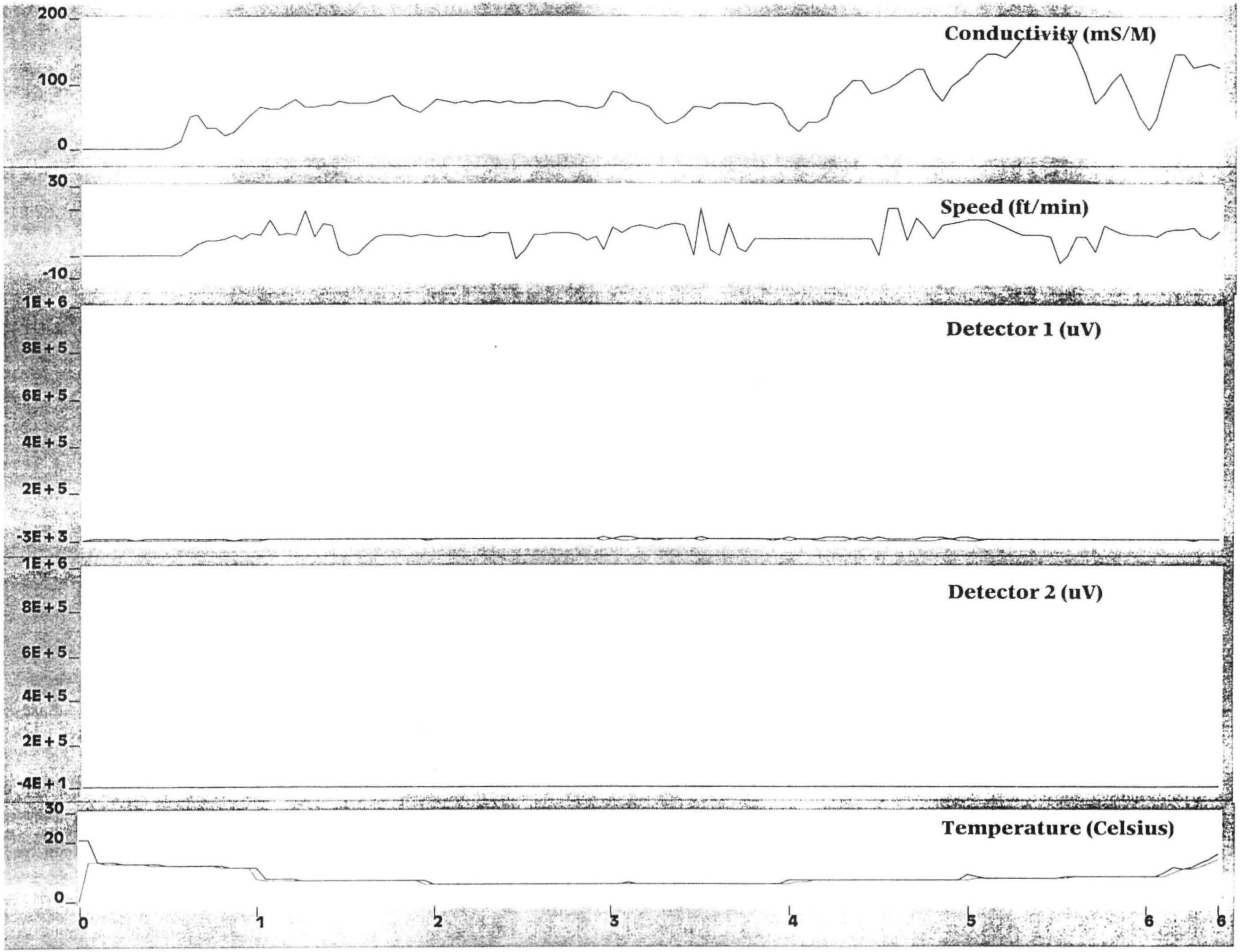


APPENDIX B
MIP Data Logs
Former Hulett Lagoon Site
Camdenton, Missouri

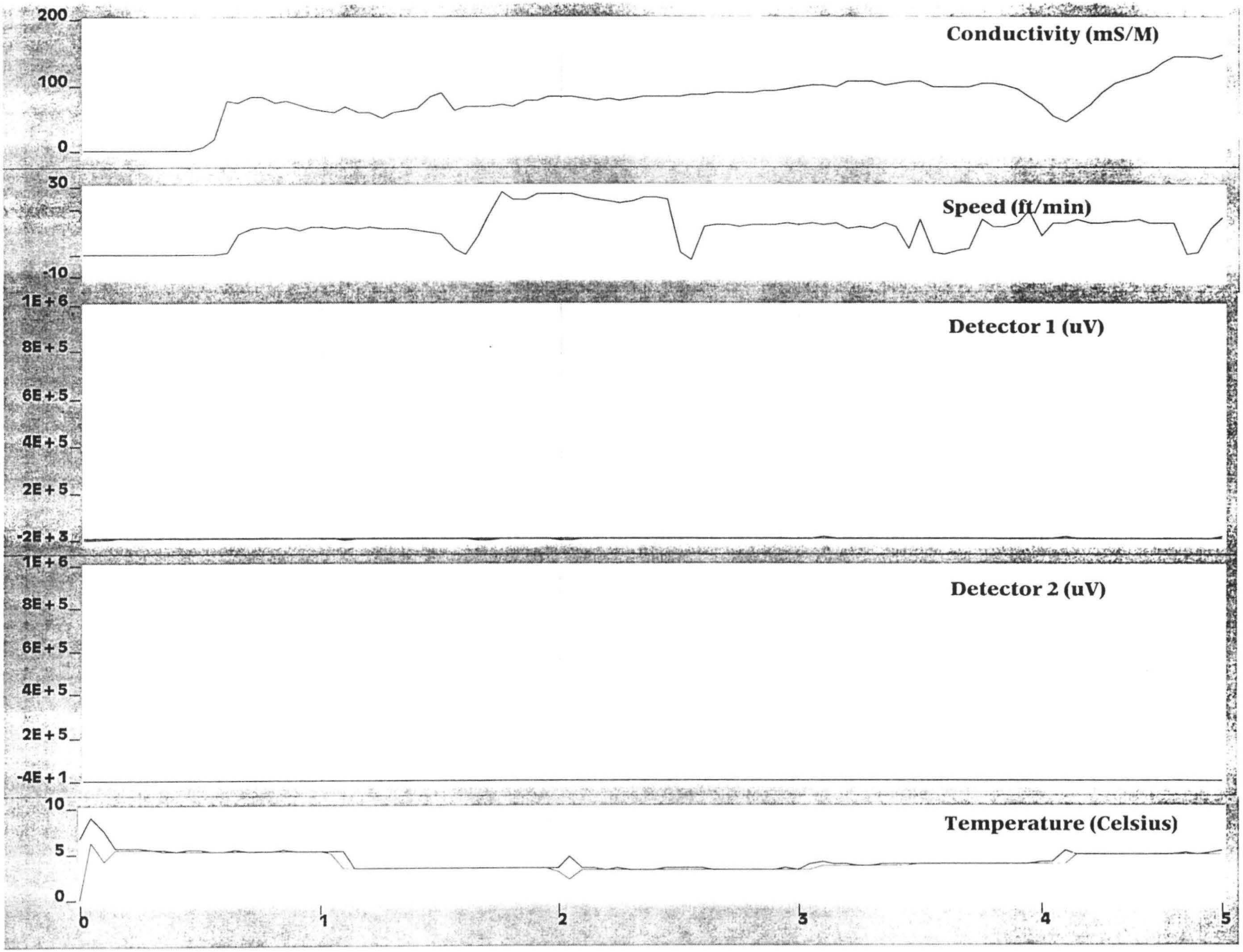
Log: C:\DIRIM95\LOGFILES\Hulett01.dat



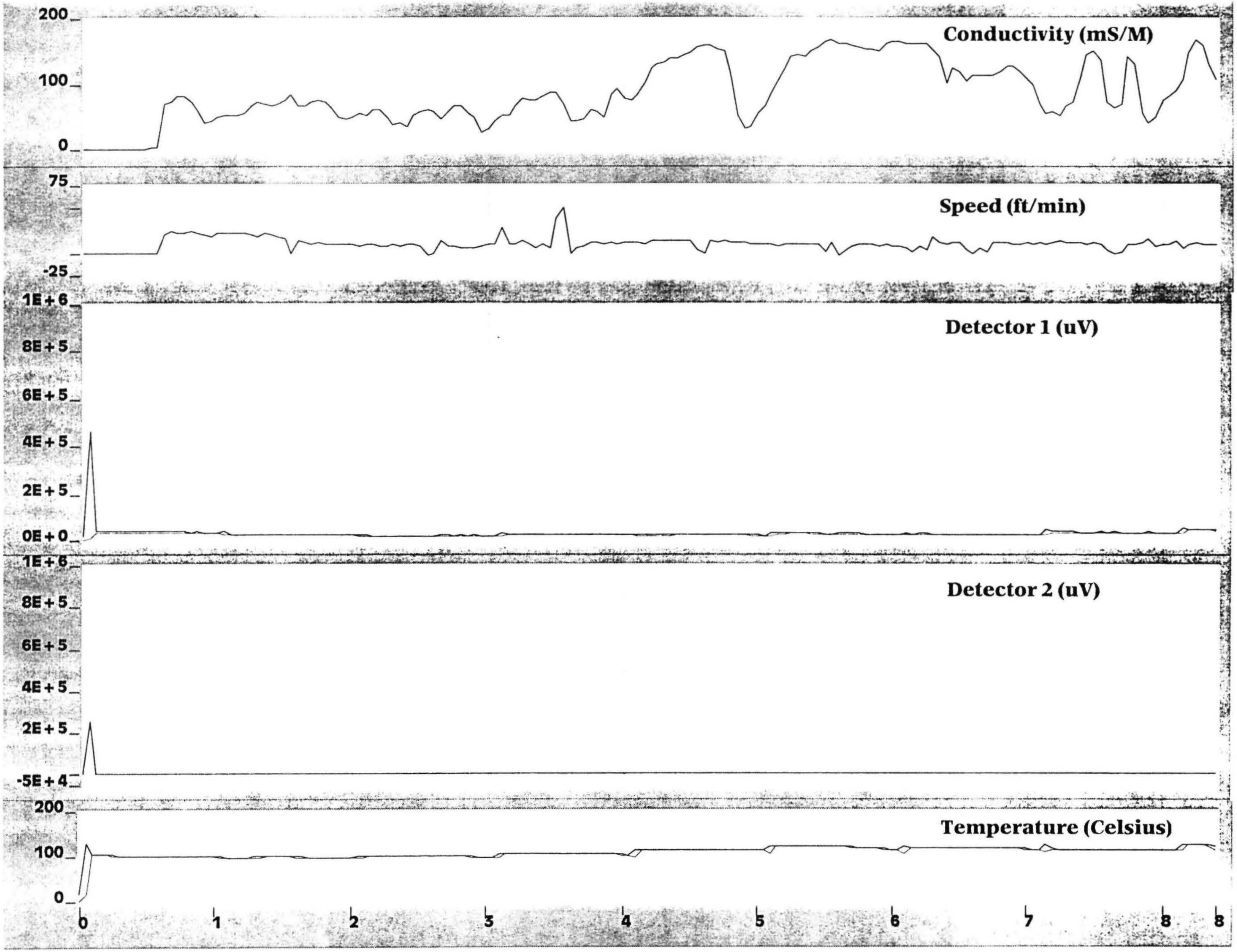
Log: C.\DIRIM95\LOGFILES\Hulett02.dat



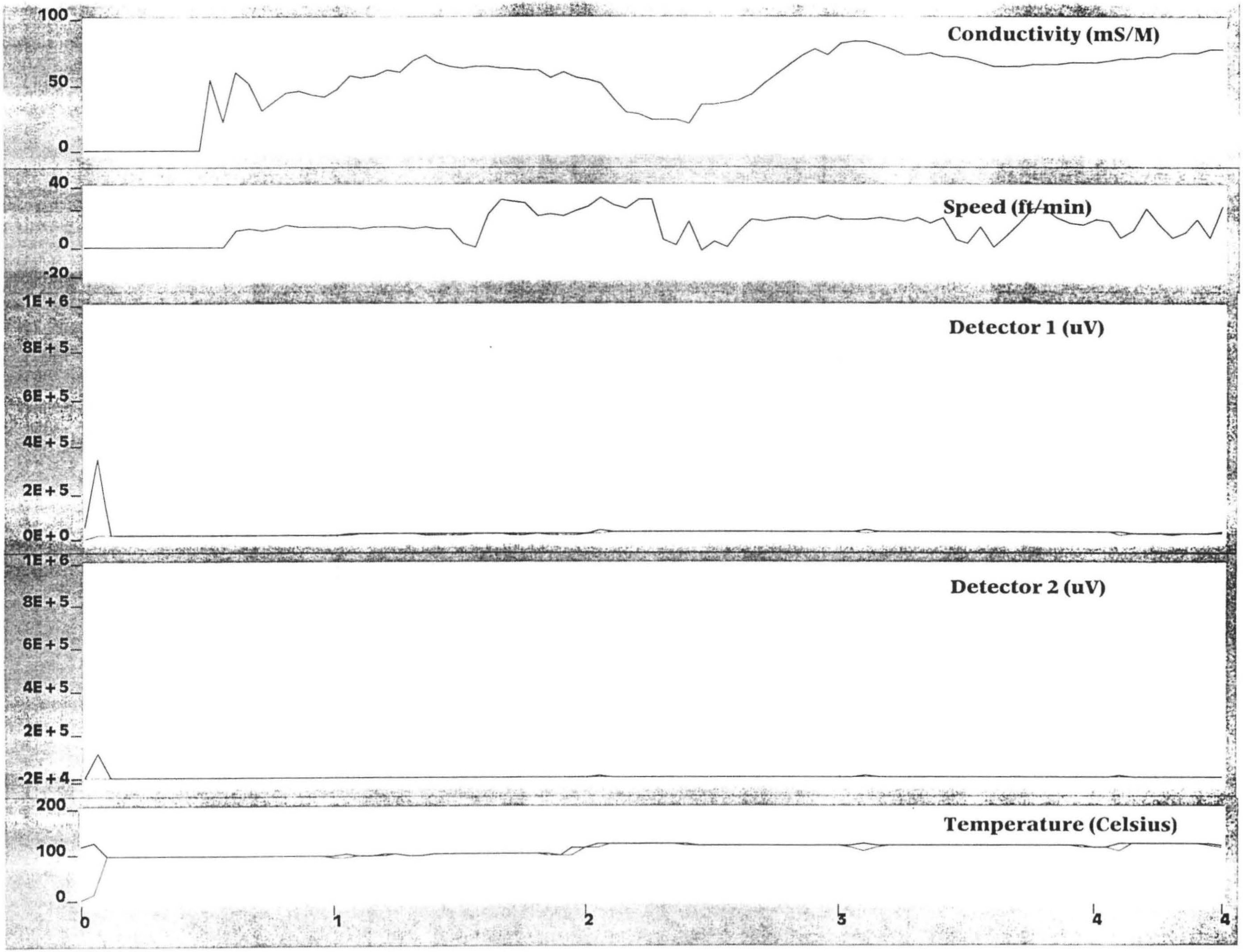
**Log: C:\DIRIM95\LOGFILES\Hulett03.dat**



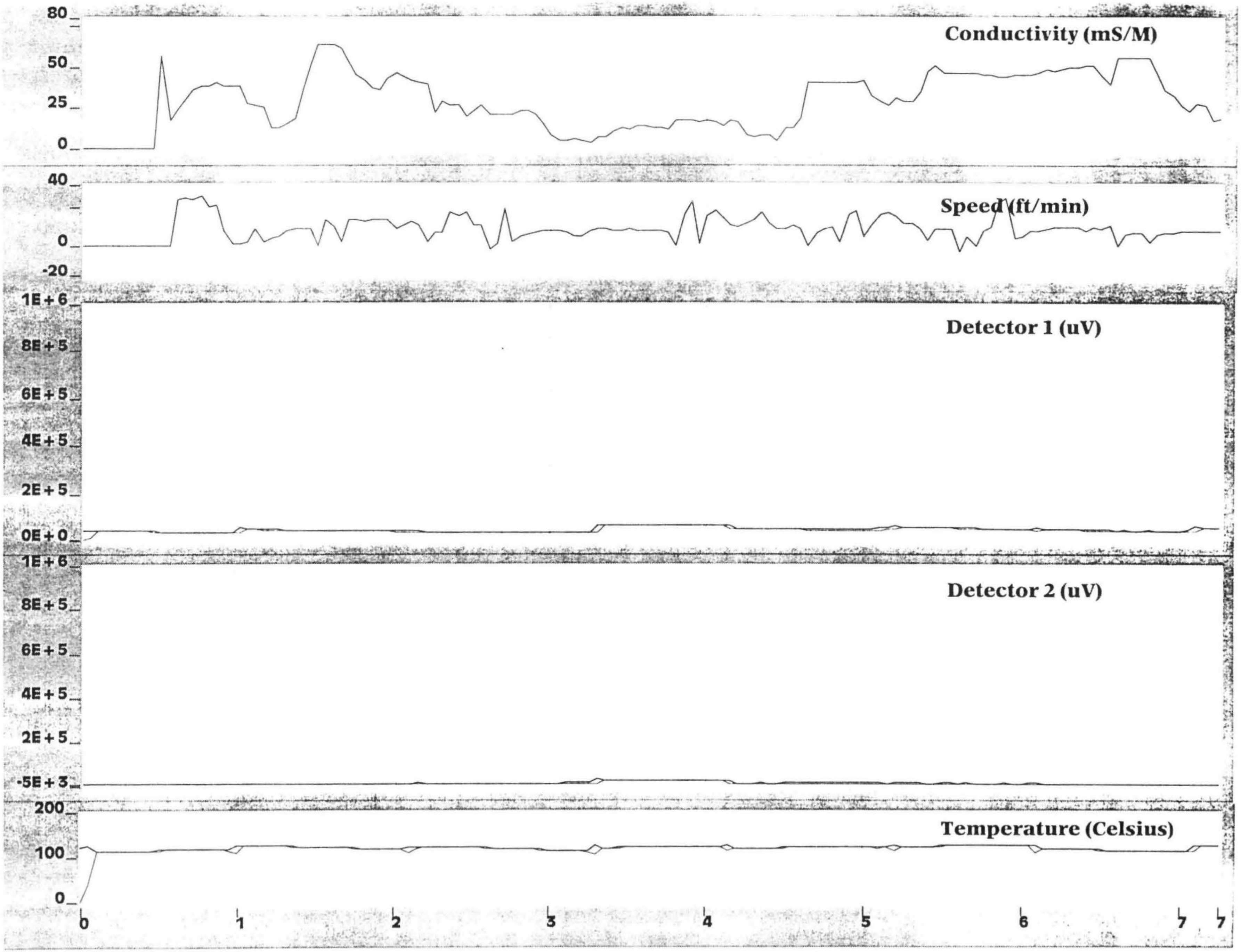
Log: C:\DIRIM95\LOGFILES\Hulett04.dat



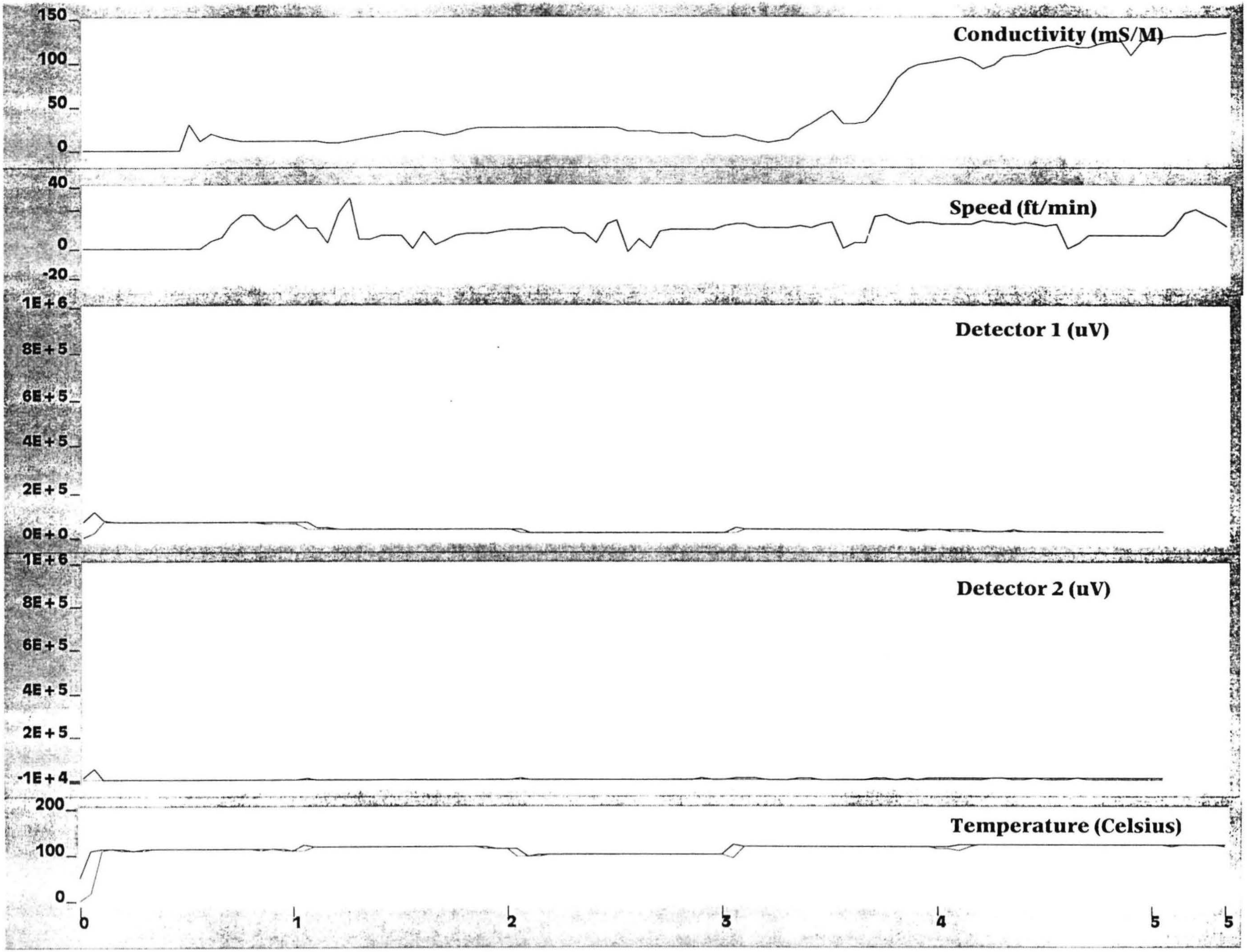
Log: C:\DIRIM95\LOGFILES\Hulett05.dat



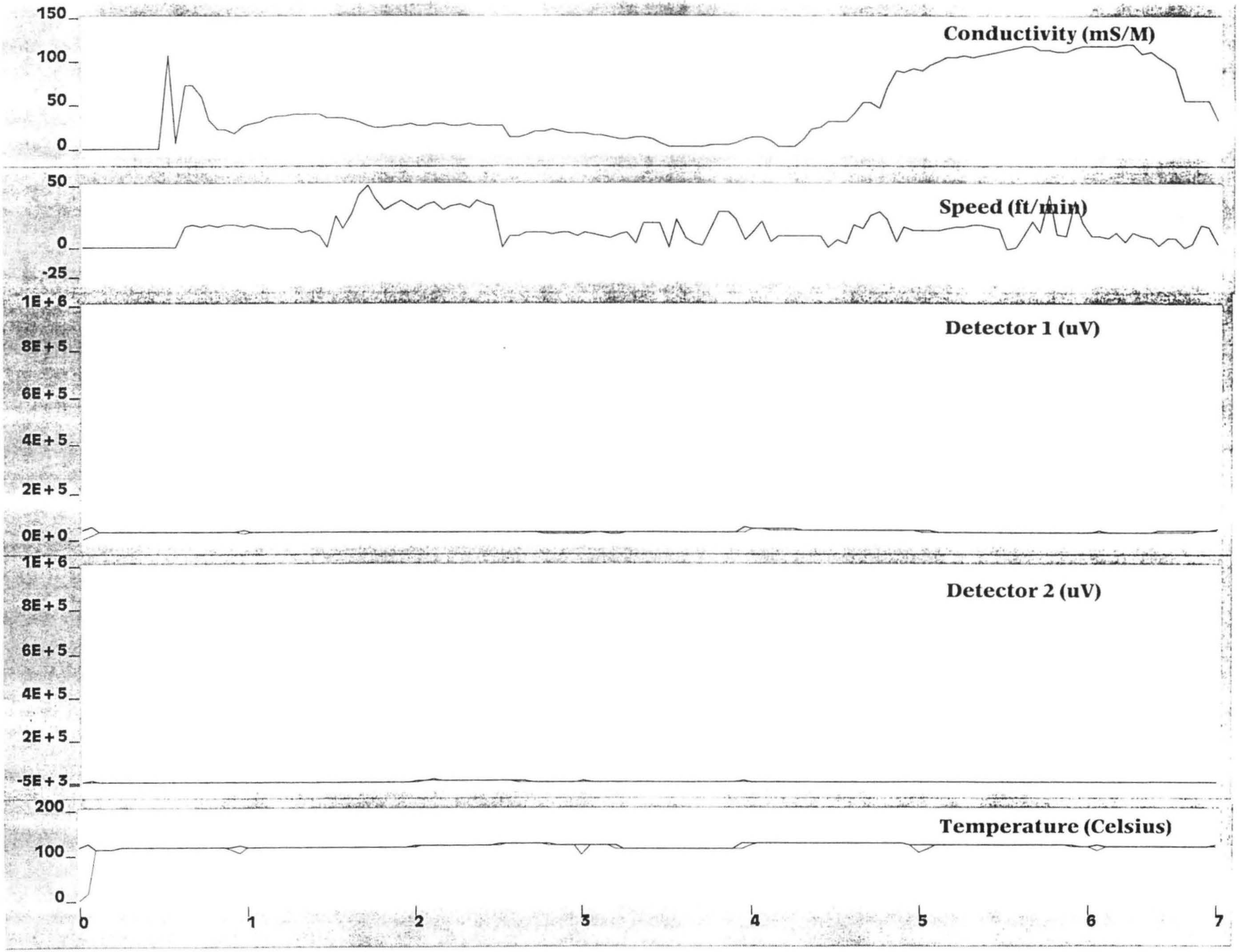
**Log: C:\…IRIM95\LOGFILES\Hulett06.dat**



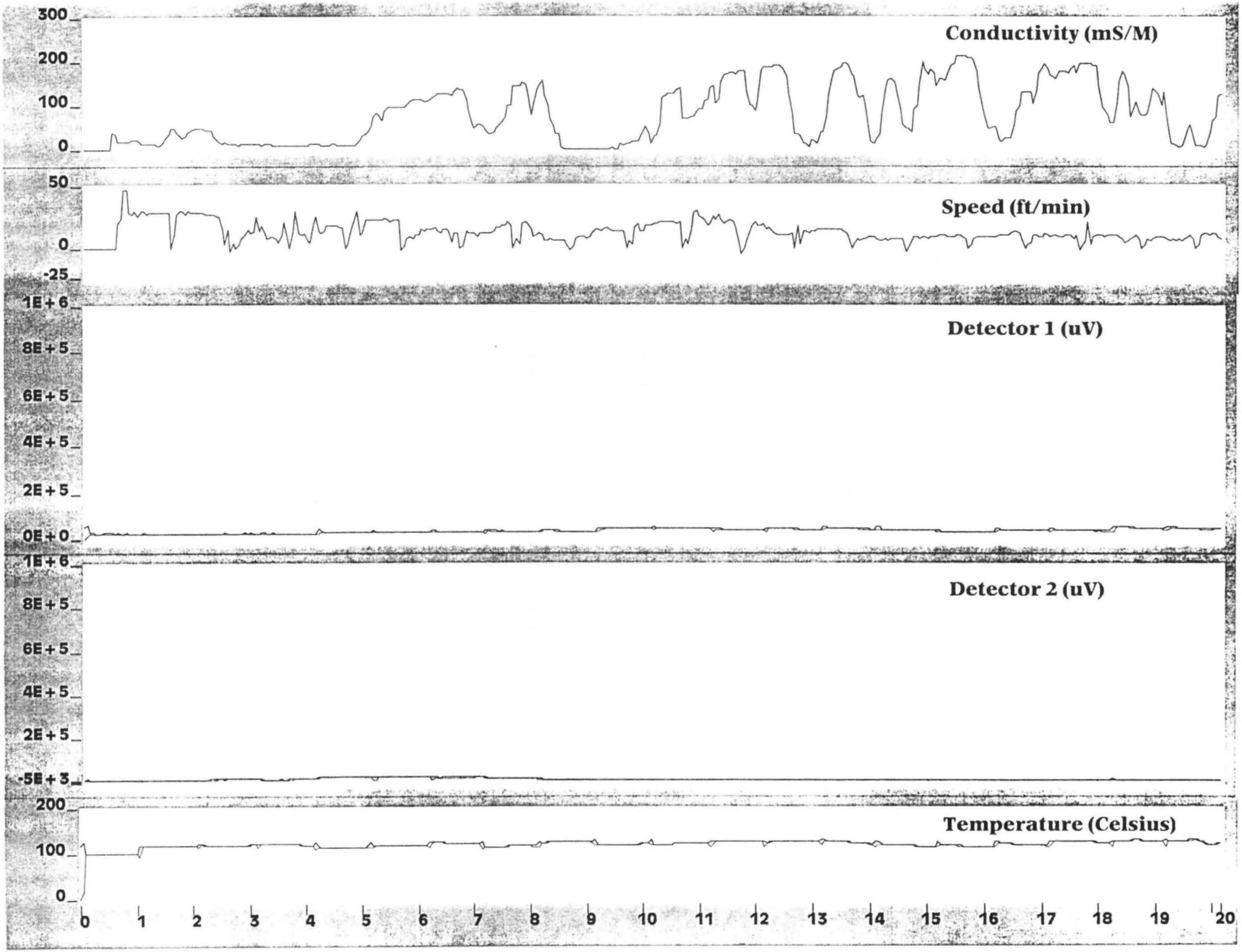
**Log: C:\DIRIM95\LOGFILES\Hulett07.dat**



Log: C:\ [illegible]RIM95\LOGFILES\Hulett08.dat



**Log: C:\DIRIM95\LOGFILES\Hulett09.dat**



APPENDIX C
Analytical Results
Former Hulett Lagoon Site
Camdenton, Missouri

STATE OF MISSOURI
Mel Carnahan Governor • Stephen M. Mahfood Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991450
Lab Number: 99-D9

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 1/26/99 |
| Affiliation: | ESP | Date Collected: | 1/ 5/99 |
| Project Code: | 4054/9096 | Date Received: | 1/ 7/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: TRIP BLANK
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| VOC Results: | | | | |
| Dichlorodifluoromethane | < 200 | ug/L | 1/12/99 | 502.2 |
| Chloromethane | < 2.5 | ug/L | 1/12/99 | 502.2 |
| Vinyl Chloride | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Bromomethane | < 9.0 | ug/L | 1/12/99 | 502.2 |
| Chloroethane | < 2.5 | ug/L | 1/12/99 | 502.2 |
| Trichlorofluoromethane | < 2.5 | ug/L | 1/12/99 | 502.2 |
| 1,1-Dichloroethene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Methylene Chloride | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Methyl-tert-butyl ether | < 2.0 | ug/L | 1/12/99 | 502.2 |
| trans-1,2-Dichloroethene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,1-Dichloroethane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 2,2-Dichloropropane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| cis-1,2-Dichloroethene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Chloroform | 4.6 | ug/L | 1/12/99 | 502.2 |
| Bromochloromethane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 1,1,1-Trichloroethane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,1-Dichloropropene | < 1.0 | ug/L | 1/12/99 | 502.2 |
| Carbon Tetrachloride | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Benzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,2-Dichloroethane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Trichloroethene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,2-Dichloropropane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Bromodichloromethane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Dibromomethane | < 1.0 | ug/L | 1/12/99 | 502.2 |

Page 2
Lab Number: 99-D9
Sample Number: 991450
January 26, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| cis-1,3-Dichloropropane | < 2.0 | ug/L | 1/12/99 | 502.2 |
| Toluene | < 0.6 | ug/L | 1/12/99 | 502.2 |
| trans-1,3-Dichloropropane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 1,1,2-Trichloroethane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Tetrachloroethene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,3-Dichloropropane | < 2.0 | ug/L | 1/12/99 | 502.2 |
| Dibromochloromethane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,2-Dibromoethane | < 2.0 | ug/L | 1/12/99 | 502.2 |
| Chlorobenzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Ethylbenzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,1,1,2-Tetrachloroethane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| Total Xylenes | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Styrene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Isopropylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| Bromoform | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,1,2,2-Tetrachloroethane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 1,2,3-Trichloropropane | < 1.0 | ug/l | 1/12/99 | 502.2 |
| n-Propylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| Bromobenzene | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 2-Chlorotoluene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| 4-Chlorotoluene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| 1,3,5-Trimethylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| tert-Butylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | 1/12/99 | 502.2 |
| sec-Butylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| p-isopropyltoluene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| 1,3-Dichlorobenzene | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 1,4-Dichlorobenzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| n-Butylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| 1,2-Dichlorobenzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | ug/L | 1/12/99 | 502.2 |
| 1,2,4-Trichlorobenzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Hexachlorobutadiene | < 1.0 | ug/L | 1/12/99 | 502.2 |
| Naphthalene | < 20.0 | ug/L | 1/12/99 | 502.2 |
| 1,2,3-Trichlorobenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. L

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

## RESULTS OF SAMPLE ANALYSES

Sample Number: 991451
Lab Number: 99-D10

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: WATER GRAB OF PAUL BUCKWALTER RESIDENTIAL WELL (BOX 45A, NORMAC ESTATES)
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Specific Conductivity | 918 | umhos/cm | 1/ 6/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.03 | | 1/ 6/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 15 | Degrees C | 1/ 6/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 62.8 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Total | 44.7 | ug/L | 1/13/99 | 200.7 |
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | < 2.5 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOC Results: | | | | |
| Dichlorodifluoromethane | < 200 | ug/L | 1/12/99 | 502.2 |
| Chloromethane | < 2.5 | ug/L | 1/12/99 | 502.2 |
| Vinyl Chloride | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Bromomethane | < 9.0 | ug/L | 1/12/99 | 502.2 |
| Chloroethane | < 2.5 | ug/L | 1/12/99 | 502.2 |
| Trichlorofluoromethane | < 2.5 | ug/L | 1/12/99 | 502.2 |

Page 2
Lab Number: 99-D10
Sample Number: 991451
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| 1,1-Dichloroethene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Methylene Chloride | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Methyl-tert-butyl ether | < 2.0 | ug/L | 1/12/99 | 502.2 |
| trans-1,2-Dichloroethene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,1-Dichloroethane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 2,2-Dichloropropane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| cis-1,2-Dichloroethene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Chloroform | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Bromochloromethane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 1,1,1-Trichloroethane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,1-Dichloropropene | < 1.0 | ug/L | 1/12/99 | 502.2 |
| Carbon Tetrachloride | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Benzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,2-Dichloroethane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Trichloroethene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,2-Dichloropropane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Bromodichloromethane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Dibromomethane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| cis-1,3-Dichloropropane | < 2.0 | ug/L | 1/12/99 | 502.2 |
| Toluene | < 0.6 | ug/L | 1/12/99 | 502.2 |
| trans-1,3-Dichloropropane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 1,1,2-Trichloroethane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Tetrachloroethene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,3-Dichloropropane | < 2.0 | ug/L | 1/12/99 | 502.2 |
| Dibromochloromethane | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,2-Dibromoethane | < 2.0 | ug/L | 1/12/99 | 502.2 |
| Chlorobenzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Ethylbenzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,1,1,2-Tetrachloroethane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| Total Xylenes | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Styrene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Isopropylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| Bromoform | < 0.5 | ug/L | 1/12/99 | 502.2 |
| 1,1,2,2-Tetrachloroethane | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 1,2,3-Trichloropropane | < 1.0 | ug/l | 1/12/99 | 502.2 |
| n-Propylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| Bromobenzene | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 2-Chlorotoluene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| 4-Chlorotoluene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| 1,3,5-Trimethylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| tert-Butylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | 1/12/99 | 502.2 |
| sec-Butylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| p-isopropyltoluene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| 1,3-Dichlorobenzene | < 1.0 | ug/L | 1/12/99 | 502.2 |
| 1,4-Dichlorobenzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| n-Butylbenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |
| 1,2-Dichlorobenzene | < 0.5 | ug/L | 1/12/99 | 502.2 |

Lab Number: 99-D10
Sample Number: 991451
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| 1,2-Dibromo-3-Chloroprop | < 5.0 | ug/L | 1/12/99 | 502.2 |
| 1,2,4-Trichlorobenzene | < 0.5 | ug/L | 1/12/99 | 502.2 |
| Hexachlorobutadiene | < 1.0 | ug/L | 1/12/99 | 502.2 |
| Naphthalene | < 20.0 | ug/L | 1/12/99 | 502.2 |
| 1,2,3-Trichlorobenzene | < 2.0 | ug/L | 1/12/99 | 502.2 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas Edwards for
James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI
Mel Carnahan Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991452
Lab Number: 99-D11

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/10/99 |
| Affiliation: | ESP | Date Collected: | 1/ 6/99 |
| Project Code: | 4054/9096 | Date Received: | 1/ 7/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF DAVE BURNAN RESIDENTIAL WELL (178 SUNSET DR), LOCATED DIRECTLY NORTH OF MODINE MFG
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Specific Conductivity | 649 | umhos/cm | 1/ 6/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.55 | | 1/ 6/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 12 | Degrees C | 1/ 6/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 67.5 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Total | 27.5 | ug/L | 1/13/99 | 200.7 |
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | 11.2 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | < 2.5 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOA Results: | | | | |
| Chloromethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Vinyl Chloride | < 5.0 | ug/L | 1/14/99 | 8260 |
| Bromomethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Chloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,1-Dichloroethene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Acetone | < 20.0 | ug/L | 1/14/99 | 8260 |

Page 2
Lab Number: 99-D11
Sample Number: 991452
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Carbon Disulfide | < 5.0 | ug/L | 1/14/99 | 8260 |
| Methylene Chloride | < 20.0 | ug/L | 1/14/99 | 8260 |
| Methyl Tert-Butyl Ether | < 5.0 | ug/L | 1/14/99 | 8260 |
| trans-1,2-Dichloroethene | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,1-Dichloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| 2-Butanone | < 20.0 | ug/L | 1/14/99 | 8260 |
| cis-1,2-Dichloroethene | 13.0 | ug/L | 1/14/99 | 8260 |
| Chloroform | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,1,1-Trichloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Carbon Tetrachloride | < 5.0 | ug/L | 1/14/99 | 8260 |
| Benzene | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,2-Dichloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Trichloroethene | 240 | ug/L | 1/14/99 | 8260 |
| 1,2-Dichloropropane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Bromodichloromethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| 2-Hexanone | < 20.0 | ug/L | 1/14/99 | 8260 |
| Trans-1,3-Dichloropropene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Toluene | 6.1 | ug/L | 1/14/99 | 8260 |
| CIS-1,3-Dichloropropene | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,1,2-Trichloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| 4-Methyl-2-Pentanone | < 20.0 | ug/L | 1/14/99 | 8260 |
| Tetrachloroethene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Dibromochloromethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Chlorobenzene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Ethylbenzene | 5.3 | ug/L | 1/14/99 | 8260 |
| Total Xylenes | 15.0 | ug/L | 1/14/99 | 8260 |
| Styrene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Bromoform | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,3-Dichlorobenzene | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,4-Dichlorobenzene | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,2-Dichlorobenzene | < 5.0 | ug/L | 1/14/99 | 8260 |

Lab Number: 99-D11
Sample Number: 991452
February 10, 1999

VOA Comments:
A 1:2 dilution was employed to quantitate TCE.

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M Mahfood Director

STATE OF MISSOURI
# DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991453
Lab Number: 99-D12

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF DAVE BURNAN RESIDENTIAL WELL (178 SUNSET DR), LOCATED DIRECTLY NORTH OF MODINE MFG,(DUPL)
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Specific Conductivity | 649 | umhos/cm | 1/ 6/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.55 | | 1/ 6/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 12 | Degrees C | 1/ 6/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 66.6 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Total | 16.3 | ug/L | 1/13/99 | 200.7 |
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | 60.4 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | < 2.5 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOA Results: | | | | |
| Chloromethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Vinyl Chloride | < 5.0 | ug/L | 1/14/99 | 8260 |
| Bromomethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Chloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,1-Dichloroethene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Acetone | < 20.0 | ug/L | 1/14/99 | 8260 |

Recycled Paper

Lab Number: 99-D12
Sample Number: 991453
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Carbon Disulfide | < 5.0 | ug/L | 1/14/99 | 8260 |
| Methylene Chloride | < 20.0 | ug/L | 1/14/99 | 8260 |
| Methyl Tert-Butyl Ether | < 5.0 | ug/L | 1/14/99 | 8260 |
| trans-1,2-Dichloroethene | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,1-Dichloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| 2-Butanone | < 20.0 | ug/L | 1/14/99 | 8260 |
| cis-1,2-Dichloroethene | 13.0 | ug/L | 1/14/99 | 8260 |
| Chloroform | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,1,1-Trichloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Carbon Tetrachloride | < 5.0 | ug/L | 1/14/99 | 8260 |
| Benzene | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,2-Dichloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Trichloroethene | 230 | ug/L | 1/14/99 | 8260 |
| 1,2-Dichloropropane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Bromodichloromethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| 2-Hexanone | < 20.0 | ug/L | 1/14/99 | 8260 |
| Trans-1,3-Dichloropropene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Toluene | < 5.0 | ug/L | 1/14/99 | 8260 |
| CIS-1,3-Dichloropropene | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,1,2-Trichloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| 4-Methyl-2-Pentanone | < 20.0 | ug/L | 1/14/99 | 8260 |
| Tetrachloroethene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Dibromochloromethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| Chlorobenzene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Ethylbenzene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Total Xylenes | < 5.0 | ug/L | 1/14/99 | 8260 |
| Styrene | < 5.0 | ug/L | 1/14/99 | 8260 |
| Bromoform | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,3-Dichlorobenzene | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,4-Dichlorobenzene | < 5.0 | ug/L | 1/14/99 | 8260 |
| 1,2-Dichlorobenzene | < 5.0 | ug/L | 1/14/99 | 8260 |

VOA Comments:
A 1:2 dilution was employed to quantitate TCE.

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
# DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991458
Lab Number: 99-D17

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/10/99 |
| Affiliation: | ESP | Date Collected: | 1/ 6/99 |
| Project Code: | 4054/9096 | Date Received: | 1/ 7/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF CAMDENTON CITY WELL #4 (BLAIR WELL)
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Specific Conductivity | 569 | umhos/cm | 1/ 6/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.68 | | 1/ 6/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 16 | Degrees C | 1/ 6/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 45.3 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Total | 21.7 | ug/L | 1/13/99 | 200.7 |
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | 4.4 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOC Results: | | | | |
| Dichlorodifluoromethane | < 200 | ug/L | 1/13/99 | 502.2 |
| Chloromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Vinyl Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromomethane | < 9.0 | ug/L | 1/13/99 | 502.2 |
| Chloroethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Trichlorofluoromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Methylene Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methyl-tert-butyl ether | < 2.0 | ug/L | 1/13/99 | 502.2 |
| trans-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2,2-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Chloroform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromochloromethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,1-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloropropene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Carbon Tetrachloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Benzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Trichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloropropane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromodichloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Dibromomethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Toluene | < 0.6 | ug/L | 1/13/99 | 502.2 |
| trans-1,3-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,2-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Tetrachloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Dibromochloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromoethane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Chlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Ethylbenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,1,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Total Xylenes | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Styrene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Isopropylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Bromoform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,2,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichloropropane | < 1.0 | ug/l | 1/13/99 | 502.2 |
| n-Propylbenzene | < 10.0 | ug/L | 1/13/99 | 502.2 |
| Bromobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 4-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3,5-Trimethylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| tert-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| sec-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| p-isopropyltoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichlorobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,4-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| n-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | ug/L | 1/13/99 | 502.2 |

Lab Number: 99-D17
Sample Number: 991458
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Hexachlorobutadiene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Naphthalene | < 20.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichlorobenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991459
Lab Number: 99-D18

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF CAMDENTON CITY WELL KNOWN AS MULBERRY WELL
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Specific Conductivity | 526 | umhos/cm | 1/ 6/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.74 | | 1/ 6/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 15 | Degrees C | 1/ 6/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 45.3 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Total | 31.7 | ug/L | 1/13/99 | 200.7 |
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | 15.7 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOC Results: | | | | |
| Dichlorodifluoromethane | < 200 | ug/L | 1/13/99 | 502.2 |
| Chloromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Vinyl Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromomethane | < 9.0 | ug/L | 1/13/99 | 502.2 |
| Chloroethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Trichlorofluoromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |

Recycled Paper

Lab Number: 99-D18
Sample Number: 991459
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Methylene Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methyl-tert-butyl ether | < 2.0 | ug/L | 1/13/99 | 502.2 |
| trans-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2,2-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Chloroform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromochloromethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,1-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloropropene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Carbon Tetrachloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Benzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Trichloroethene | 5.3 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloropropane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromodichloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Dibromomethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Toluene | < 0.6 | ug/L | 1/13/99 | 502.2 |
| trans-1,3-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,2-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Tetrachloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Dibromochloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromoethane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Chlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Ethylbenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,1,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Total Xylenes | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Styrene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Isopropylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Bromoform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,2,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichloropropane | < 1.0 | ug/l | 1/13/99 | 502.2 |
| n-Propylbenzene | < 10.0 | ug/L | 1/13/99 | 502.2 |
| Bromobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 4-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3,5-Trimethylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| tert-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| sec-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| p-isopropyltoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichlorobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,4-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| n-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | ug/L | 1/13/99 | 502.2 |

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Hexachlorobutadiene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Naphthalene | < 20.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichlorobenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for
James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
# DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

## RESULTS OF SAMPLE ANALYSES

Sample Number: 991460
Lab Number: 99-D19

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/10/99 |
| Affiliation: | ESP | Date Collected: | 1/ 6/99 |
| Project Code: | 4054/9096 | Date Received: | 1/ 7/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-3, LOCATED ON SOUTH END OF LOT, SOUTHWEST OF MODINE MANUFACTURING BUILDING
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Turbidity | 951 | NTU | 1/ 6/99 | 180.1 |
| Comment: Analyzed in field | | | | |
| Specific Conductivity | 701 | umhos/cm | 1/ 6/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.48 | | 1/ 6/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 15 | Degrees C | 1/ 6/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Dissolved | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Dissolved | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Dissolved | 69.6 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Dissolved | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Dissolved | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Mercury, Dissolved | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Lead, Dissolved | < 2.5 | ug/L | 1/14/99 | 239.2 |
| Selenium, Dissolved | < 1.0 | ug/L | 1/14/99 | 270.2 |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | 6.0 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 151 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | 2.26 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | 45.7 | ug/L | 1/13/99 | 200.7 |

Lab Number: 99-D19
Sample Number: 991460
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Copper, Total | 51.2 | ug/L | 1/13/99 | 200.7 |
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | 29.7 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | 97.6 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOC Results: | | | | |
| Dichlorodifluoromethane | < 200 | ug/L | 1/13/99 | 502.2 |
| Chloromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Vinyl Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromomethane | < 9.0 | ug/L | 1/13/99 | 502.2 |
| Chloroethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Trichlorofluoromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methylene Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methyl-tert-butyl ether | < 2.0 | ug/L | 1/13/99 | 502.2 |
| trans-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2,2-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Chloroform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromochloromethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,1-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloropropene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Carbon Tetrachloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Benzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Trichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloropropane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromodichloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Dibromomethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Toluene | < 0.6 | ug/L | 1/13/99 | 502.2 |
| trans-1,3-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,2-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Tetrachloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Dibromochloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromoethane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Chlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Ethylbenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,1,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Total Xylenes | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Styrene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Isopropylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Bromoform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,2,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichloropropane | < 1.0 | ug/l | 1/13/99 | 502.2 |
| n-Propylbenzene | < 10.0 | ug/L | 1/13/99 | 502.2 |

Lab Number: 99-D19
Sample Number: 991460
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Bromobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 4-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3,5-Trimethylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| tert-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| sec-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| p-isopropyltoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichlorobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,4-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| n-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Hexachlorobutadiene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Naphthalene | < 20.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichlorobenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for
James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI

Mel Carnahan Governor • Stephen M. Mahfood Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991461
Lab Number: 99-D20

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-4, LOCATED AT MAIN ENTRANCE TO MODINE MFG PROPERTY COLLECTED VIA SUBMERSIBLE PUMP
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Turbidity | 86.6 | NTU | 1/ 6/99 | 180.1 |
| Comment: Analyzed in field | | | | |
| Specific Conductivity | 687 | umhos/cm | 1/ 6/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.22 | | 1/ 6/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 15 | Degrees C | 1/ 6/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Dissolved | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Dissolved | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Dissolved | 81.6 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Dissolved | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Dissolved | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Mercury, Dissolved | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Dissolved | 5.81 | ug/L | 1/13/99 | 200.7 |
| Lead, Dissolved | < 2.5 | ug/L | 1/14/99 | 239.2 |
| Selenium, Dissolved | < 1.0 | ug/L | 1/14/99 | 270.2 |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 88.3 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | 5.52 | ug/L | 1/13/99 | 200.7 |

Recycled Paper

Lab Number: 99-D20
Sample Number: 991461
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Copper, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | 7.61 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | 38.7 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOC Results: | | | | |
| Dichlorodifluoromethane | < 200 | ug/L | 1/13/99 | 502.2 |
| Chloromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Vinyl Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromomethane | < 9.0 | ug/L | 1/13/99 | 502.2 |
| Chloroethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Trichlorofluoromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methylene Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methyl-tert-butyl ether | < 2.0 | ug/L | 1/13/99 | 502.2 |
| trans-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2,2-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,2-Dichloroethene | 2.1 | ug/L | 1/13/99 | 502.2 |
| Chloroform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromochloromethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,1-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloropropene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Carbon Tetrachloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Benzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Trichloroethene | 64.1 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloropropane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromodichloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Dibromomethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Toluene | < 0.6 | ug/L | 1/13/99 | 502.2 |
| trans-1,3-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,2-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Tetrachloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Dibromochloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromoethane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Chlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Ethylbenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,1,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Total Xylenes | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Styrene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Isopropylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Bromoform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,2,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichloropropane | < 1.0 | ug/l | 1/13/99 | 502.2 |
| n-Propylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |

Lab Number: 99-D20
Sample Number: 991461
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Bromobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 4-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3,5-Trimethylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| tert-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| sec-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| p-isopropyltoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichlorobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,4-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| n-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Hexachlorobutadiene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Naphthalene | < 20.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichlorobenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for
James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI

Mel Carnahan Governor • Stephen M. Mahfood Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991462
Lab Number: 99-D21

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 1/26/99
Date Collected: 1/ 6/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-4, LOCATED AT MAIN ENTRANCE TO MODINE MFG PROPERTY COLLECTED VIA BAILER
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| VOC Results: | | | | |
| Dichlorodifluoromethane | < 200 | ug/L | 1/13/99 | 502.2 |
| Chloromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Vinyl Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromomethane | < 9.0 | ug/L | 1/13/99 | 502.2 |
| Chloroethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Trichlorofluoromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methylene Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methyl-tert-butyl ether | < 2.0 | ug/L | 1/13/99 | 502.2 |
| trans-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2,2-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,2-Dichloroethene | 2.3 | ug/L | 1/13/99 | 502.2 |
| Chloroform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromochloromethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,1-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloropropene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Carbon Tetrachloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Benzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Trichloroethene | 76.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloropropane | < 0.5 | ug/L | 1/13/99 | 502.2 |

Page 2
Lab Number: 99-D21
Sample Number: 991462
January 26, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Bromodichloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Dibromomethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Toluene | < 0.6 | ug/L | 1/13/99 | 502.2 |
| trans-1,3-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,2-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Tetrachloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Dibromochloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromoethane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Chlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Ethylbenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,1,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Total Xylenes | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Styrene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Isopropylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Bromoform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,2,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichloropropane | < 1.0 | ug/l | 1/13/99 | 502.2 |
| n-Propylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Bromobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 4-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3,5-Trimethylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| tert-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| sec-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| p-isopropyltoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichlorobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,4-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| n-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Hexachlorobutadiene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Naphthalene | < 20.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichlorobenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991463
Lab Number: 99-D22

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/10/99
Date Collected: 1/ 7/99
Date Received: 1/ 7/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-2, LOCATED ON NORTHEAST SIDE OF MODINE MFG BUILDING
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Turbidity | 372 | NTU | 1/ 7/99 | 180.1 |
| Comment: Analyzed in field | | | | |
| Specific Conductivity | 796 | umhos/cm | 1/ 7/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.16 | | 1/ 7/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 13 | Degrees C | 1/ 7/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Dissolved | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Dissolved | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Dissolved | 91.0 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Dissolved | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Dissolved | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Mercury, Dissolved | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Lead, Dissolved | < 2.5 | ug/L | 1/14/99 | 239.2 |
| Selenium, Dissolved | < 1.0 | ug/L | 1/14/99 | 270.2 |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 112 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | 14.3 | ug/L | 1/13/99 | 200.7 |
| Copper, Total | 7.85 | ug/L | 1/13/99 | 200.7 |

Lab Number: 99-D22
Sample Number: 991463
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | 8.45 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | 37.2 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOC Results: | | | | |
| Dichlorodifluoromethane | < 200 | ug/L | 1/13/99 | 502.2 |
| Chloromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Vinyl Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromomethane | < 9.0 | ug/L | 1/13/99 | 502.2 |
| Chloroethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Trichlorofluoromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methylene Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methyl-tert-butyl ether | < 2.0 | ug/L | 1/13/99 | 502.2 |
| trans-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2,2-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Chloroform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromochloromethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,1-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloropropene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Carbon Tetrachloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Benzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Trichloroethene | 2.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloropropane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromodichloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Dibromomethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Toluene | < 0.6 | ug/L | 1/13/99 | 502.2 |
| trans-1,3-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,2-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Tetrachloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Dibromochloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromoethane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Chlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Ethylbenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,1,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Total Xylenes | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Styrene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Isopropylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Bromoform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,2,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichloropropane | < 1.0 | ug/l | 1/13/99 | 502.2 |
| n-Propylbenzene | < 10.0 | ug/L | 1/13/99 | 502.2 |
| Bromobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |

Lab Number: 99-D22
Sample Number: 991463
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| 2-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 4-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3,5-Trimethylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| tert-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| sec-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| p-isopropyltoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichlorobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,4-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| n-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Hexachlorobutadiene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Naphthalene | < 20.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichlorobenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director
STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

# ENVIRONMENTAL SERVICES PROGRAM

## RESULTS OF SAMPLE ANALYSES

Sample Number: 991464
Lab Number: 99-D23

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/10/99 |
| Affiliation: | ESP | Date Collected: | 1/ 7/99 |
| Project Code: | 4054/9096 | Date Received: | 1/ 7/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-1, LOCATED IN WESTERN GRAVEL PARKING LOT ON MODINE MANUFACTURING PROPERTY
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Turbidity | 143 | NTU | 1/ 7/99 | 180.1 |
| Comment: Analyzed in field | | | | |
| Specific Conductivity | 532 | umhos/cm | 1/ 7/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.62 | | 1/ 7/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 13 | Degrees C | 1/ 7/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Dissolved | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Dissolved | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Dissolved | 49.7 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Dissolved | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Dissolved | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Mercury, Dissolved | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Lead, Dissolved | < 2.5 | ug/L | 1/14/99 | 239.2 |
| Selenium, Dissolved | < 1.0 | ug/L | 1/14/99 | 270.2 |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 58.2 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | 3.84 | ug/L | 1/13/99 | 200.7 |

Lab Number: 99-D23
Sample Number: 991464
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Copper, Total | 6.94 | ug/L | 1/13/99 | 200.7 |
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | 14.1 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOC Results: | | | | |
| Dichlorodifluoromethane | < 200 | ug/L | 1/13/99 | 502.2 |
| Chloromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Vinyl Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromomethane | < 9.0 | ug/L | 1/13/99 | 502.2 |
| Chloroethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| Trichlorofluoromethane | < 2.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methylene Chloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Methyl-tert-butyl ether | < 2.0 | ug/L | 1/13/99 | 502.2 |
| trans-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2,2-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,2-Dichloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Chloroform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromochloromethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,1-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1-Dichloropropene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Carbon Tetrachloride | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Benzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Trichloroethene | 10.1 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichloropropane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Bromodichloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Dibromomethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| cis-1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Toluene | < 0.6 | ug/L | 1/13/99 | 502.2 |
| trans-1,3-Dichloropropane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,1,2-Trichloroethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Tetrachloroethene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichloropropane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Dibromochloromethane | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromoethane | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Chlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Ethylbenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,1,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Total Xylenes | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Styrene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Isopropylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| Bromoform | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,1,2,2-Tetrachloroethane | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichloropropane | < 1.0 | ug/l | 1/13/99 | 502.2 |
| n-Propylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |

Lab Number: 99-D23
Sample Number: 991464
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Bromobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 2-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 4-Chlorotoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3,5-Trimethylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| tert-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| sec-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| p-isopropyltoluene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,3-Dichlorobenzene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| 1,4-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| n-Butylbenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,4-Trichlorobenzene | < 0.5 | ug/L | 1/13/99 | 502.2 |
| Hexachlorobutadiene | < 1.0 | ug/L | 1/13/99 | 502.2 |
| Naphthalene | < 20.0 | ug/L | 1/13/99 | 502.2 |
| 1,2,3-Trichlorobenzene | < 2.0 | ug/L | 1/13/99 | 502.2 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for
James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991465
Lab Number: 99-D24

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/10/99 |
| Affiliation: | ESP | Date Collected: | 1/ 7/99 |
| Project Code: | 4054/9096 | Date Received: | 1/ 7/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-5, LOCATED ADJACENT (SOUTHWEST) TO FORMER HULETT LAGOON
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Turbidity | 456 | NTU | 1/ 7/99 | 180.1 |
| Comment: Analyzed in field | | | | |
| Specific Conductivity | 709 | umhos/cm | 1/ 7/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.50 | | 1/ 7/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 12 | Degrees C | 1/ 7/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Dissolved | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Dissolved | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Dissolved | 55.7 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Dissolved | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Dissolved | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Mercury, Dissolved | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Lead, Dissolved | < 2.5 | ug/L | 1/14/99 | 239.2 |
| Selenium, Dissolved | < 1.0 | ug/L | 1/14/99 | 270.2 |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 67.9 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | 1.25 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | 9.39 | ug/L | 1/13/99 | 200.7 |
| Copper, Total | 7.52 | ug/L | 1/13/99 | 200.7 |

Lab Number: 99-D24
Sample Number: 991465
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | 5.16 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | 12.7 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOA Results: | | | | |
| Chloromethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Vinyl Chloride | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Bromomethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Chloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,1-Dichloroethene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Acetone | < 20.0 | ug/L | 1/ 8/99 | 8260 |
| Carbon Disulfide | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Methylene Chloride | < 20.0 | ug/L | 1/ 8/99 | 8260 |
| Methyl Tert-Butyl Ether | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| trans-1,2-Dichloroethene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,1-Dichloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 2-Butanone | < 20.0 | ug/L | 1/ 8/99 | 8260 |
| cis-1,2-Dichloroethene | 35.0 | ug/L | 1/ 8/99 | 8260 |
| Chloroform | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,1,1-Trichloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Carbon Tetrachloride | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Benzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,2-Dichloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Trichloroethene | 1,400 | ug/L | 1/ 8/99 | 8260 |
| 1,2-Dichloropropane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Bromodichloromethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 2-Hexanone | < 20.0 | ug/L | 1/ 8/99 | 8260 |
| Trans-1,3-Dichloropropene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Toluene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| CIS-1,3-Dichloropropene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,1,2-Trichloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 4-Methyl-2-Pentanone | < 20.0 | ug/L | 1/ 8/99 | 8260 |
| Tetrachloroethene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Dibromochloromethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Chlorobenzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Ethylbenzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Total Xylenes | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Styrene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Bromoform | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,3-Dichlorobenzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,4-Dichlorobenzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,2-Dichlorobenzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991466
Lab Number: 99-D25

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/10/99 |
| Affiliation: | ESP | Date Collected: | 1/ 7/99 |
| Project Code: | 4054/9096 | Date Received: | 1/ 7/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE, WATER
Sample Description: GRAB OF MW-5, LOCATED ADJACENT (SOUTHWEST) TO FORMER HULETT LAGOON (DUPLICATE)
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Turbidity | 456 | NTU | 1/ 7/99 | 180.1 |
| Comment: Analyzed in field | | | | |
| Specific Conductivity | 709 | umhos/cm | 1/ 7/99 | 120.1 |
| Comment: Analyzed in field | | | | |
| pH | 7.50 | | 1/ 7/99 | 150.1 |
| Comment: Analyzed in field | | | | |
| Temperature - C | 12 | Degrees C | 1/ 7/99 | |
| Comment: Analyzed in field | | | | |
| Silver, Dissolved | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Dissolved | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Dissolved | 51.6 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Dissolved | < 1.00 | ug/L | 1/13/99 | 200.7 |
| Chromium, Dissolved | < 2.00 | ug/L | 1/13/99 | 200.7 |
| Copper, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Mercury, Dissolved | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Dissolved | < 3.00 | ug/L | 1/13/99 | 200.7 |
| Lead, Dissolved | < 2.5 | ug/L | 1/14/99 | 239.2 |
| Selenium, Dissolved | < 1.0 | ug/L | 1/14/99 | 270.2 |
| Silver, Total | < 5.00 | ug/L | 1/13/99 | 200.7 |
| Arsenic, Total | < 1.2 | ug/L | 1/14/99 | 206.2 |
| Barium, Total | 71.3 | ug/L | 1/13/99 | 200.7 |
| Cadmium, Total | 1.97 | ug/L | 1/13/99 | 200.7 |
| Chromium, Total | 13.3 | ug/L | 1/13/99 | 200.7 |

Recycled Paper

Lab Number: 99-D25
Sample Number: 991466
February 10, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Copper, Total | 8.97 | ug/L | 1/13/99 | 200.7 |
| Mercury, Total | < 0.20 | ug/L | 1/29/99 | 245.1 |
| Nickel, Total | 4.26 | ug/L | 1/13/99 | 200.7 |
| Lead, Total | 15.3 | ug/L | 1/14/99 | 239.2 |
| Selenium, Total | < 1.0 | ug/L | 1/14/99 | 270.2 |
| VOA Results: | | | | |
| Chloromethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Vinyl Chloride | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Bromomethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Chloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,1-Dichloroethene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Acetone | < 20.0 | ug/L | 1/ 8/99 | 8260 |
| Carbon Disulfide | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Methylene Chloride | < 20.0 | ug/L | 1/ 8/99 | 8260 |
| Methyl Tert-Butyl Ether | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| trans-1,2-Dichloroethene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,1-Dichloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 2-Butanone | < 20.0 | ug/L | 1/ 8/99 | 8260 |
| cis-1,2-Dichloroethene | 23.0 | ug/L | 1/ 8/99 | 8260 |
| Chloroform | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,1,1-Trichloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Carbon Tetrachloride | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Benzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,2-Dichloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Trichloroethene | 1,500 | ug/L | 1/ 8/99 | 8260 |
| 1,2-Dichloropropane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Bromodichloromethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 2-Hexanone | < 20.0 | ug/L | 1/ 8/99 | 8260 |
| Trans-1,3-Dichloropropene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Toluene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| CIS-1,3-Dichloropropene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,1,2-Trichloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 4-Methyl-2-Pentanone | < 20.0 | ug/L | 1/ 8/99 | 8260 |
| Tetrachloroethene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Dibromochloromethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Chlorobenzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Ethylbenzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Total Xylenes | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Styrene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| Bromoform | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,3-Dichlorobenzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,4-Dichlorobenzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |
| 1,2-Dichlorobenzene | < 5.0 | ug/L | 1/ 8/99 | 8260 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for
James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
# DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991467
Lab Number: 99-D136

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/24/99 |
| Affiliation: | ESP | Date Collected: | 1/21/99 |
| Project Code: | 4054/9096 | Date Received: | 1/22/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-03" COLLECTED FROM 3-4 FT DEPTH
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Silver, Total | < 1,000 | ug/kg | 2/ 3/99 | 200.7 |
| Arsenic, Total | 13,600 | ug/kg | 2/ 4/99 | 206.2 |
| Barium, Total | 244,000 | ug/kg | 2/ 3/99 | 200.7 |
| Cadmium, Total | 304 | ug/kg | 2/ 3/99 | 200.7 |
| Chromium, Total | 55,500 | ug/kg | 2/ 3/99 | 200.7 |
| Copper, Total | 33,600 | ug/kg | 2/ 3/99 | 200.7 |
| Mercury, Total | 107 | ug/kg | 1/29/99 | 245.1 |
| Nickel, Total | 49,400 | ug/kg | 2/ 3/99 | 200.7 |
| Lead, Total | 118,000 | ug/kg | 2/ 3/99 | 239.2 |
| Selenium, Total | < 1,000 | ug/kg | 2/ 4/99 | 270.2 |
| Lead, TCLP | 77.2 | ug/L | 2/19/99 | 239.2 |
| VOA Results: | | | | |
| Chloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Vinyl Chloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromomethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Acetone | < 100 | ug/kg | 1/25/99 | 8260 |
| Carbon Disulfide | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Methylene Chloride | < 100 | ug/kg | 1/25/99 | 8260 |
| Methyl Tertiary Butyl Eth | < 25.0 | ug/kg | 1/25/99 | 8260 |
| trans-1,2-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Butanone | < 100 | ug/kg | 1/25/99 | 8260 |

Lab Number: 99-D136
Sample Number: 991467
February 24, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| cis-1,2-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chloroform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,1-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Carbon Tetrachloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Benzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Trichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloropropane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromodichloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Hexanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Trans-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Toluene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| CIS-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 4-Methyl-2-Pentanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Tetrachloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Dibromochloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Ethylbenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Total Xylenes | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Styrene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromoform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,3-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,4-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991468
Lab Number: 99-D137

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/24/99 |
| Affiliation: | ESP | Date Collected: | 1/21/99 |
| Project Code: | 4054/9096 | Date Received: | 1/22/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-03" COLLECTED FROM 4.5-5.5 FT DEPTH
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Silver, Total | < 1,000 | ug/kg | 2/ 3/99 | 200.7 |
| Arsenic, Total | 12,500 | ug/kg | 2/ 4/99 | 206.2 |
| Barium, Total | 519,000 | ug/kg | 2/ 3/99 | 200.7 |
| Cadmium, Total | 386 | ug/kg | 2/ 3/99 | 200.7 |
| Chromium, Total | 61,300 | ug/kg | 2/ 3/99 | 200.7 |
| Copper, Total | 37,500 | ug/kg | 2/ 3/99 | 200.7 |
| Mercury, Total | 139 | ug/kg | 1/29/99 | 245.1 |
| Nickel, Total | 69,600 | ug/kg | 2/ 3/99 | 200.7 |
| Lead, Total | 951,000 | ug/kg | 2/ 3/99 | 239.2 |
| Selenium, Total | < 1,000 | ug/kg | 2/ 4/99 | 270.2 |
| Barium, TCLP | 442 | ug/L | 2/19/99 | 200.7 |
| Lead, TCLP | 143 | ug/L | 2/19/99 | 239.2 |
| VOA Results: | | | | |
| Chloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Vinyl Chloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromomethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Acetone | < 100 | ug/kg | 1/25/99 | 8260 |
| Carbon Disulfide | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Methylene Chloride | < 100 | ug/kg | 1/25/99 | 8260 |
| Methyl Tertiary Butyl Eth | < 25.0 | ug/kg | 1/25/99 | 8260 |
| trans-1,2-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |

Page 2
Lab Number: 99-D137
Sample Number: 991468
February 24, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| 2-Butanone | < 100 | ug/kg | 1/25/99 | 8260 |
| cis-1,2-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chloroform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,1-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Carbon Tetrachloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Benzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Trichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloropropane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromodichloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Hexanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Trans-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Toluene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| CIS-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 4-Methyl-2-Pentanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Tetrachloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Dibromochloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Ethylbenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Total Xylenes | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Styrene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromoform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,3-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,4-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991469
Lab Number: 99-D138

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/24/99 |
| Affiliation: | ESP | Date Collected: | 1/21/99 |
| Project Code: | 4054/9096 | Date Received: | 1/22/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-01" COLLECTED FROM 4.5-5 FT DEPTH
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Silver, Total | < 1,000 | ug/kg | 2/ 3/99 | 200.7 |
| Arsenic, Total | 16,100 | ug/kg | 2/ 4/99 | 206.2 |
| Barium, Total | 150,000 | ug/kg | 2/ 3/99 | 200.7 |
| Cadmium, Total | 453 | ug/kg | 2/ 3/99 | 200.7 |
| Chromium, Total | 74,900 | ug/kg | 2/ 3/99 | 200.7 |
| Copper, Total | 39,900 | ug/kg | 2/ 3/99 | 200.7 |
| Mercury, Total | 102 | ug/kg | 1/29/99 | 245.1 |
| Nickel, Total | 43,300 | ug/kg | 2/ 3/99 | 200.7 |
| Lead, Total | 116,000 | ug/kg | 2/ 3/99 | 239.2 |
| Selenium, Total | < 1,000 | ug/kg | 2/ 4/99 | 270.2 |
| Lead, TCLP | < 25.0 | ug/L | 2/19/99 | 239.2 |
| VOA Results: | | | | |
| Chloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Vinyl Chloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromomethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Acetone | < 100 | ug/kg | 1/25/99 | 8260 |
| Carbon Disulfide | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Methylene Chloride | < 100 | ug/kg | 1/25/99 | 8260 |
| Methyl Tertiary Butyl Eth | < 25.0 | ug/kg | 1/25/99 | 8260 |
| trans-1,2-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Butanone | < 100 | ug/kg | 1/25/99 | 8260 |

Page 2
Lab Number: 99-D138
Sample Number: 991469
February 24, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| cis-1,2-Dichloroethene | 190 | ug/kg | 1/25/99 | 8260 |
| Chloroform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,1-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Carbon Tetrachloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Benzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Trichloroethene | 9,500 | ug/kg | 1/25/99 | 8260 |
| Comment: Dilution analyzed 1/26/99 | | | | |
| 1,2-Dichloropropane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromodichloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Hexanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Trans-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Toluene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| CIS-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 4-Methyl-2-Pentanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Tetrachloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Dibromochloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Ethylbenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Total Xylenes | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Styrene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromoform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,3-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,4-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| VOA TCLP Results: | | | | |
| Vinyl Chloride (TCLP) | < 200 | ug/L | 2/ 8/99 | 8260 |
| 1,1-Dichloroethene (TCLP) | < 200 | ug/L | 2/ 8/99 | 8260 |
| 2-Butanone (TCLP) | < 800 | ug/L | 2/ 8/99 | 8260 |
| Chloroform (TCLP) | < 200 | ug/L | 2/ 8/99 | 8260 |
| Carbon Tetrachlor. (TCLP) | < 200 | ug/L | 2/ 8/99 | 8260 |
| Benzene (TCLP) | < 200 | ug/L | 2/ 8/99 | 8260 |
| 1,2-Dichloroethane (TCLP) | < 200 | ug/L | 2/ 8/99 | 8260 |
| Trichloroethene (TCLP) | < 200 | ug/L | 2/ 8/99 | 8260 |
| Tetrachloroethene (TCLP) | < 200 | ug/L | 2/ 8/99 | 8260 |
| Chlorobenzene (TCLP) | < 200 | ug/L | 2/ 8/99 | 8260 |
| 1,4-Dichlorobenz. (TCLP) | < 200 | ug/L | 2/ 8/99 | 8260 |

| |
|---|
| Metals results are reported on a dry weight basis |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991470
Lab Number: 99-D139

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/17/99 |
| Affiliation: | ESP | Date Collected: | 1/21/99 |
| Project Code: | 4054/9096 | Date Received: | 1/22/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-02" COLLECTED FROM 6.5-7 FT DEPTH
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Silver, Total | < 1,000 | ug/kg | 2/ 3/99 | 200.7 |
| Arsenic, Total | 3,580 | ug/kg | 2/ 4/99 | 206.2 |
| Barium, Total | 62,400 | ug/kg | 2/ 3/99 | 200.7 |
| Cadmium, Total | 254 | ug/kg | 2/ 3/99 | 200.7 |
| Chromium, Total | 31,900 | ug/kg | 2/ 3/99 | 200.7 |
| Copper, Total | 15,700 | ug/kg | 2/ 3/99 | 200.7 |
| Mercury, Total | < 40.0 | ug/kg | 1/29/99 | 245.1 |
| Nickel, Total | 12,500 | ug/kg | 2/ 3/99 | 200.7 |
| Lead, Total | 38,100 | ug/kg | 2/ 3/99 | 239.2 |
| Selenium, Total | < 1,000 | ug/kg | 2/ 4/99 | 270.2 |
| VOA Results: | | | | |
| Chloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Vinyl Chloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromomethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Acetone | < 100 | ug/kg | 1/25/99 | 8260 |
| Carbon Disulfide | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Methylene Chloride | < 100 | ug/kg | 1/25/99 | 8260 |
| Methyl Tertiary Butyl Eth | < 25.0 | ug/kg | 1/25/99 | 8260 |
| trans-1,2-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Butanone | < 100 | ug/kg | 1/25/99 | 8260 |
| cis-1,2-Dichloroethene | 140 | ug/kg | 1/25/99 | 8260 |

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Chloroform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,1-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Carbon Tetrachloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Benzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Trichloroethene | 240 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloropropane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromodichloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Hexanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Trans-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Toluene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| CIS-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 4-Methyl-2-Pentanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Tetrachloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Dibromochloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Ethylbenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Total Xylenes | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Styrene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromoform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,3-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,4-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
# DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

## RESULTS OF SAMPLE ANALYSES

Sample Number: 991471
Lab Number: 99-D140

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/24/99 |
| Affiliation: | ESP | Date Collected: | 1/21/99 |
| Project Code: | 4054/9096 | Date Received: | 1/22/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-04" COLLECTED FROM 7.5-8 FT DEPTH
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Silver, Total | < 1,000 | ug/kg | 2/ 3/99 | 200.7 |
| Arsenic, Total | 19,700 | ug/kg | 2/ 4/99 | 206.2 |
| Barium, Total | 750,000 | ug/kg | 2/ 3/99 | 200.7 |
| Cadmium, Total | 4,520 | ug/kg | 2/ 3/99 | 200.7 |
| Chromium, Total | 68,900 | ug/kg | 2/ 3/99 | 200.7 |
| Copper, Total | 64,300 | ug/kg | 2/ 3/99 | 200.7 |
| Mercury, Total | 195 | ug/kg | 1/29/99 | 245.1 |
| Nickel, Total | 90,100 | ug/kg | 2/ 3/99 | 200.7 |
| Lead, Total | 325,000 | ug/kg | 2/ 3/99 | 239.2 |
| Selenium, Total | < 1,000 | ug/kg | 2/ 4/99 | 270.2 |
| Barium, TCLP | 628 | ug/L | 2/19/99 | 200.7 |
| Lead, TCLP | < 25.0 | ug/L | 2/19/99 | 239.2 |
| VOA Results: | | | | |
| Chloromethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Vinyl Chloride | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Bromomethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Chloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1-Dichloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Acetone | < 100 | ug/kg | 1/26/99 | 8260 |
| Carbon Disulfide | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Methylene Chloride | < 100 | ug/kg | 1/26/99 | 8260 |
| Methyl Tertiary Butyl Eth | < 25.0 | ug/kg | 1/26/99 | 8260 |
| trans-1,2-Dichloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1-Dichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| 2-Butanone | < 100 | ug/kg | 1/26/99 | 8260 |
| cis-1,2-Dichloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Chloroform | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1,1-Trichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Carbon Tetrachloride | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Benzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,2-Dichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Trichloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,2-Dichloropropane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Bromodichloromethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 2-Hexanone | < 100 | ug/kg | 1/26/99 | 8260 |
| Trans-1,3-Dichloropropene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Toluene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| CIS-1,3-Dichloropropene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1,2-Trichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 4-Methyl-2-Pentanone | < 100 | ug/kg | 1/26/99 | 8260 |
| Tetrachloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Dibromochloromethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Chlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Ethylbenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Total Xylenes | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Styrene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Bromoform | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,3-Dichlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,4-Dichlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,2-Dichlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991472
Lab Number: 99-D141

Reported To: BRIAN ALLEN
Affiliation: ESP
Project Code: 4054/9096

Report Date: 2/24/99
Date Collected: 1/21/99
Date Received: 1/22/99

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-07" COLLECTED FROM 5.5-6 FT DEPTH
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Silver, Total | < 1,000 | ug/kg | 2/ 3/99 | 200.7 |
| Arsenic, Total | 17,200 | ug/kg | 2/ 4/99 | 206.2 |
| Barium, Total | 257,000 | ug/kg | 2/ 3/99 | 200.7 |
| Cadmium, Total | 304 | ug/kg | 2/ 3/99 | 200.7 |
| Chromium, Total | 73,300 | ug/kg | 2/ 3/99 | 200.7 |
| Copper, Total | 38,800 | ug/kg | 2/ 3/99 | 200.7 |
| Mercury, Total | 141 | ug/kg | 1/29/99 | 245.1 |
| Nickel, Total | 36,200 | ug/kg | 2/ 3/99 | 200.7 |
| Lead, Total | 80,100 | ug/kg | 2/ 3/99 | 239.2 |
| Selenium, Total | < 1,000 | ug/kg | 2/ 4/99 | 270.2 |
| Lead, TCLP | < 25.0 | ug/L | 2/19/99 | 239.2 |
| VOA Results: | | | | |
| Chloromethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Vinyl Chloride | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Bromomethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Chloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1-Dichloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Acetone | < 100 | ug/kg | 1/26/99 | 8260 |
| Carbon Disulfide | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Methylene Chloride | < 100 | ug/kg | 1/26/99 | 8260 |
| Methyl Tertiary Butyl Eth | < 25.0 | ug/kg | 1/26/99 | 8260 |
| trans-1,2-Dichloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1-Dichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 2-Butanone | < 100 | ug/kg | 1/26/99 | 8260 |

Lab Number: 99-D141
Sample Number: 991472
February 24, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| cis-1,2-Dichloroethene | 110 | ug/kg | 1/26/99 | 8260 |
| Chloroform | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1,1-Trichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Carbon Tetrachloride | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Benzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,2-Dichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Trichloroethene | 120 | ug/kg | 1/26/99 | 8260 |
| 1,2-Dichloropropane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Bromodichloromethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 2-Hexanone | < 100 | ug/kg | 1/26/99 | 8260 |
| Trans-1,3-Dichloropropene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Toluene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| CIS-1,3-Dichloropropene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1,2-Trichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 4-Methyl-2-Pentanone | < 100 | ug/kg | 1/26/99 | 8260 |
| Tetrachloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Dibromochloromethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Chlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Ethylbenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Total Xylenes | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Styrene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Bromoform | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,3-Dichlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,4-Dichlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,2-Dichlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

## RESULTS OF SAMPLE ANALYSES

Sample Number: 991473
Lab Number: 99-D142

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/17/99 |
| Affiliation: | ESP | Date Collected: | 1/21/99 |
| Project Code: | 4054/9096 | Date Received: | 1/22/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-09" COLLECTED FROM 6-7 FT DEPTH
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Silver, Total | < 1,000 | ug/kg | 2/ 3/99 | 200.7 |
| Arsenic, Total | 9,680 | ug/kg | 2/ 4/99 | 206.2 |
| Barium, Total | 103,000 | ug/kg | 2/ 3/99 | 200.7 |
| Cadmium, Total | < 200 | ug/kg | 2/ 3/99 | 200.7 |
| Chromium, Total | 58,200 | ug/kg | 2/ 3/99 | 200.7 |
| Copper, Total | 6,470 | ug/kg | 2/ 3/99 | 200.7 |
| Mercury, Total | < 40.0 | ug/kg | 1/29/99 | 245.1 |
| Nickel, Total | 9,760 | ug/kg | 2/ 3/99 | 200.7 |
| Lead, Total | 39,100 | ug/kg | 2/ 3/99 | 239.2 |
| Selenium, Total | < 1,000 | ug/kg | 2/ 4/99 | 270.2 |
| VOA Results: | | | | |
| Chloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Vinyl Chloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromomethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Acetone | < 100 | ug/kg | 1/25/99 | 8260 |
| Carbon Disulfide | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Methylene Chloride | < 100 | ug/kg | 1/25/99 | 8260 |
| Methyl Tertiary Butyl Eth | < 25.0 | ug/kg | 1/25/99 | 8260 |
| trans-1,2-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Butanone | < 100 | ug/kg | 1/25/99 | 8260 |
| cis-1,2-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |

Recycled Paper

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Chloroform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,1-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Carbon Tetrachloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Benzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Trichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloropropane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromodichloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Hexanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Trans-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Toluene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| CIS-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 4-Methyl-2-Pentanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Tetrachloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Dibromochloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Ethylbenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Total Xylenes | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Styrene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromoform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,3-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,4-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI

Mel Carnahan Governor • Stephen M. Mahfood, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991474
Lab Number: 99-D143

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/17/99 |
| Affiliation: | ESP | Date Collected: | 1/21/99 |
| Project Code: | 4054/9096 | Date Received: | 1/22/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-09" COLLECTED FROM 6-7 FT DEPTH (REPLICATE)
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Silver, Total | < 1,000 | ug/kg | 2/ 3/99 | 200.7 |
| Arsenic, Total | 4,600 | ug/kg | 2/ 4/99 | 206.2 |
| Barium, Total | 132,000 | ug/kg | 2/ 3/99 | 200.7 |
| Cadmium, Total | 204 | ug/kg | 2/ 3/99 | 200.7 |
| Chromium, Total | 39,800 | ug/kg | 2/ 3/99 | 200.7 |
| Copper, Total | 8,560 | ug/kg | 2/ 3/99 | 200.7 |
| Mercury, Total | < 40.0 | ug/kg | 1/29/99 | 245.1 |
| Nickel, Total | 12,400 | ug/kg | 2/ 3/99 | 200.7 |
| Lead, Total | 61,800 | ug/kg | 2/ 3/99 | 239.2 |
| Selenium, Total | < 1,000 | ug/kg | 2/ 4/99 | 270.2 |
| VOA Results: | | | | |
| Chloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Vinyl Chloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromomethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Acetone | < 100 | ug/kg | 1/25/99 | 8260 |
| Carbon Disulfide | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Methylene Chloride | < 100 | ug/kg | 1/25/99 | 8260 |
| Methyl Tertiary Butyl Eth | < 25.0 | ug/kg | 1/25/99 | 8260 |
| trans-1,2-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Butanone | < 100 | ug/kg | 1/25/99 | 8260 |

Lab Number: 99-D143
Sample Number: 991474
February 17, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| cis-1,2-Dichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chloroform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,1-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Carbon Tetrachloride | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Benzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Trichloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichloropropane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromodichloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 2-Hexanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Trans-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Toluene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| CIS-1,3-Dichloropropene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2-Trichloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 4-Methyl-2-Pentanone | < 100 | ug/kg | 1/25/99 | 8260 |
| Tetrachloroethene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Dibromochloromethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Chlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Ethylbenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Total Xylenes | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Styrene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| Bromoform | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,3-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,4-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |
| 1,2-Dichlorobenzene | < 25.0 | ug/kg | 1/25/99 | 8260 |

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Mel Carnahan, Governor • Stephen M. Mahfood, Director

# STATE OF MISSOURI DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 991475
Lab Number: 99-D144

| | | | |
|---|---|---|---|
| Reported To: | BRIAN ALLEN | Report Date: | 2/24/99 |
| Affiliation: | ESP | Date Collected: | 1/21/99 |
| Project Code: | 4054/9096 | Date Received: | 1/22/99 |

Sample Collected by: BRIAN ALLEN, ESP
Sampling Location: FORMER HULETT LAGOON SITE
Sample Description: SOIL GRAB OF BORING "HULETT-10"
COLLECTED FROM 10.5-11 FT DEPTH
County: CAMDEN

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Silver, Total | < 1,000 | ug/kg | 2/ 3/99 | 200.7 |
| Arsenic, Total | 10,700 | ug/kg | 2/ 4/99 | 206.2 |
| Barium, Total | 203,000 | ug/kg | 2/ 3/99 | 200.7 |
| Cadmium, Total | 651 | ug/kg | 2/ 3/99 | 200.7 |
| Chromium, Total | 62,700 | ug/kg | 2/ 3/99 | 200.7 |
| Copper, Total | 36,800 | ug/kg | 2/ 3/99 | 200.7 |
| Mercury, Total | 94.7 | ug/kg | 1/29/99 | 245.1 |
| Nickel, Total | 32,500 | ug/kg | 2/ 3/99 | 200.7 |
| Lead, Total | 94,200 | ug/kg | 2/ 3/99 | 239.2 |
| Selenium, Total | < 1,000 | ug/kg | 2/ 4/99 | 270.2 |
| Lead, TCLP | < 25.0 | ug/L | 2/19/99 | 239.2 |
| VOA Results: | | | | |
| Chloromethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Vinyl Chloride | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Bromomethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Chloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1-Dichloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Acetone | < 100 | ug/kg | 1/26/99 | 8260 |
| Carbon Disulfide | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Methylene Chloride | < 100 | ug/kg | 1/26/99 | 8260 |
| Methyl Tertiary Butyl Eth | < 25.0 | ug/kg | 1/26/99 | 8260 |
| trans-1,2-Dichloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1-Dichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 2-Butanone | < 100 | ug/kg | 1/26/99 | 8260 |

Page 2
Lab Number: 99-D144
Sample Number: 991475
February 24, 1999

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| cis-1,2-Dichloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Chloroform | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1,1-Trichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Carbon Tetrachloride | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Benzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,2-Dichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Trichloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,2-Dichloropropane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Bromodichloromethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 2-Hexanone | < 100 | ug/kg | 1/26/99 | 8260 |
| Trans-1,3-Dichloropropene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Toluene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| CIS-1,3-Dichloropropene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1,2-Trichloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 4-Methyl-2-Pentanone | < 100 | ug/kg | 1/26/99 | 8260 |
| Tetrachloroethene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Dibromochloromethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Chlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Ethylbenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Total Xylenes | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Styrene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| Bromoform | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,3-Dichlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,4-Dichlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |
| 1,2-Dichlorobenzene | < 25.0 | ug/kg | 1/26/99 | 8260 |

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

Modine - Camdenton HW-TSD File

DAMES & MOORE

721 EMERSON ROAD SUITE 220 ST LOUIS MISSOURI 63...
(314) 993-4590 FAX (314) 993-4895

Former Hulett Lagoon Site
Combined PA/SI
Reference 41

November 4, 1996

Mr. Richard Nussbaum, P.E.
Groundwater Enforcement Unit Chief
Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program
P. O. Box 176
Jefferson City, Missouri 65102-0176

RECEIVED
NOV 05 1996
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

**Re: Letter Report**
**Subsurface Investigation**
**Former Hulett Lagoon**
**Camdenton, Missouri**
**Dames & Moore Job No. 27397-023-045**

Dear Mr. Nussbaum:

On behalf of Modine Manufacturing Company (Modine), Dames & Moore is pleased to submit this letter report summarizing the results of the Subsurface Investigation at the former Hulett Lagoon in Camdenton, Missouri. The former city owned and operated lagoon is located approximately 1,000 feet northeast of the Modine Heat Transfer facility. Based upon the results of the field fracture survey, the former lagoon is strongly indicated as the source of the observed trichloroethene (TCE) impact to groundwater at the Modine facility. The purpose of this investigation was to determine the presence or absence of volatile organic compounds (VOCs), in particular TCE, in soil underlying the former Hulett Lagoon.

The field investigation was conducted on October 11, 1996. Four hydraulically driven probes were advanced in the area of the lagoon in which an inlet pipe from the former Sundstrand facility and an outlet or discharge pipe from the lagoon were previously located. A figure is attached illustrating the probe locations. The probes were continuously sampled and field screened using a photoionization detector (PID). The probe logs are included as an attachment to this letter report. The sample exhibiting the highest indication of VOC content from each probe was submitted to Inchcape Testing Services Environmental Laboratories in Richardson, Texas. The soil samples were analyzed for VOCs, with TCE as the primary constituent of concern. The samples were shipped in an iced cooler under proper chain of custody by an overnight courier.

The analytical report is included as an attachment to this letter and the analytical results summarized below.

| Sample Location | Depth | Analyte Detected | Concentration in parts per billion (ppb) |
|---|---|---|---|
| GP-1 | 4-6' | Chloroform | 200 |
| | | TCE | 9,170 |
| GP-2 | 4-5.5' | TCE | 1,940 |
| GP-3 | 4-5' | Chloroform | 9.4 |
| | | cis-1,2-Dichloroethene | 91.4 |
| | | TCE | Not detected |
| GP-4 | 4-6' | TCE | Not detected |

The TCE concentrations encountered in the soil beneath the former lagoon supports our previous position of an off-site source as the source of the observed TCE impact to groundwater at the Modine facility This analytical data and the geological data resulting from the field fracture survey strongly suggests that the former lagoon is the off-site source.

If you have any questions or comments regarding the contents of this report, please contact either of the undersigned or Mr. Thomas Sanicola with Modine at (414) 636-1649.

Very truly yours,

DAMES & MOORE

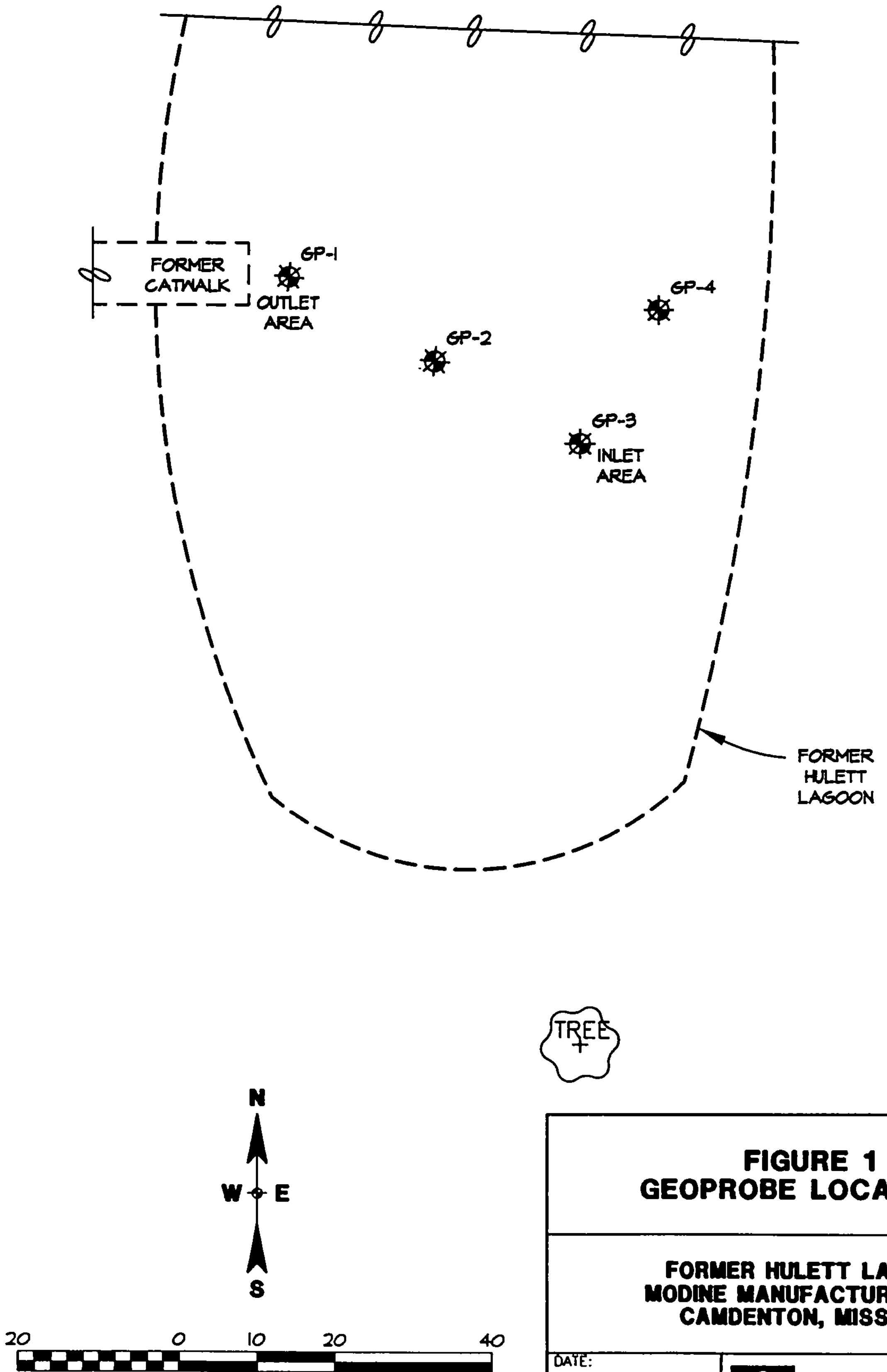
Miesche M. Francis
Assistant Geologist

Daniel J. Price, P.G.
Senior Geologist

DJP:lk
Attachments
cc: Darleen Westcott - MDNR
Thomas Sanicola - Modine
P \045\NOV96\MISC\NUSSBA04.RPT

**ATTACHMENT 1**

**FIGURE**




# FIGURE 1
# GEOPROBE LOCATIONS

**FORMER HULETT LAGOON**
**MODINE MANUFACTURING CO.**
**CAMDENTON, MISSOURI**

| | |
|---|---|
| DATE: Oct. 30, 1996 | |
| JOB NO.: 27397-023-045 | |
| DRAWN BY JMS | CHK'D BY DJP |
| SCALE: 1" =20' | |

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

P:\CADD-J\27397\023\023PFIG1.DWG::10/30/96

# ATTACHMENT 2

# PROBE LOGS

| | |
|---|---|
| Client: Modine Heat Transfer, Inc. | **PROBE ID GP-1** |
| Project Number: 27397-023-045 | Monitoring Well Data: / Elevation: |
| Project: TCE Investigation Former Hulett Lagoon | Pipe: / Datum: |
| Location: Camdenton, Missouri | Screen: / Ground Surface: |
| Driller: GeoEnvironmental | Slot: / Measuring Pt: |
| Borehole Logged By: Miesche Francis | Sand: / Top of Casing: |
| Drilling Method: GeoProbe® | Sample Type |
| Date Installed: October 11, 1996 | CT - Cuttings; SS - Split Spoon; WA - Wash Sample; CC - Continuos Core; RX - Rock Core; ST - Shelby Tube |
| Surface Conditions: Grass | |

| DESCRIPTION | USCS | Stratigraphy | Depth (ft.) | OVM (ppm) | Completion | Sample Lab | Sample Interval | Sample Type |
|---|---|---|---|---|---|---|---|---|
| 0' - 1" Top soil, with organic material, slight organic odor. | | | 0 | | GRANULAR BENTONITE | | | |
| 1" - 4' CLAY, yellowish red, with cherty gravel, soft, moist, slight solvent odor at 4'. | CL | | 1 | 142.6 | | | | |
| | | | 2 | | | | | |
| | | | 3 | | | | | |
| 4'-6' CLAY, yellowish red, with cherty gravel, with cherty gravel, trace of organic material, tight, dry, slight solvent odor. | | | 4 | 1999 | | Y | 4'-6' | CC |
| | | | 5 | | | | | |
| Refusal at 6'. | | | 6 | | | | | |
| | | | 7 | | | | | |
| | | | 8 | | | | | |
| | | | 9 | | | | | |
| | | | 10 | | | | | |
| | | | 11 | | | | | |
| | | | 12 | | | | | |
| | | | 13 | | | | | |
| | | | 14 | | | | | |
| | | | 15 | | | | | |
| | | | 16 | | | | | |
| | | | 17 | | | | | |
| | | | 18 | | | | | |
| | | | 19 | | | | | |
| | | | 20 | | | | | |
| | | | 21 | | | | | |
| | | | 22 | | | | | |
| | | | 23 | | | | | |
| | | | 24 | | | | | |
| | | | 25 | | | | | |

Note: This borehole was prepared for hydrogeological and/or environmental assessment purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Dames & Moore personnel before use by others.

| | | |
|---|---|---|
| Client: Modine Heat Transfer, Inc. | **PROBE ID GP-2** | |
| Project Number: 27397-023-045 | Monitoring Well Data: | Elevation: |
| Project: TCE Investigation Former Hulett Lagoon | Pipe: | Datum: |
| Location: Camdenton, Missouri | Screen: | Ground Surface: |
| Driller: GeoEnvironmental | Slot: | Measuring Pt: |
| Borehole Logged By: Miesche Francis | Sand: | Top of Casing: |
| Drilling Method: GeoProbe® | Sample Type | |
| Date Installed: October 11, 1996 | CT - Cuttings<br>SS - Split Spoon<br>WA - Wash Sample | CC - Continuos Core<br>RX - Rock Core<br>ST - Shelby Tube |
| Surface Conditions: Grass | | |

| DESCRIPTION | USCS | Stratigraphy | Depth (ft.) | OVM (ppm) | Completion | Sample: Lab | Sample: Interval | Sample: Type |
|---|---|---|---|---|---|---|---|---|
| 0'-4' CLAY, yellowish red, with cherty gravel, soft, moist, abundant organics at 3', musty odor (2' of recovery). | CL | | 0–4 | 6.80 | GRANULAR BENTONITE | | | |
| 4'-5 1/2' CLAY, yellowish red, with cherty gravel, tight, dry, trace of organic material, slight solvent odor. | | | 4–5 1/2 | 648.3 | GRANULAR BENTONITE | Y | 4'-51/2' | CC |
| Refusal at 5 1/2'. | | | | | | | | |

Depth scale (ft.): 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Note: This borehole was prepared for hydrogeological and/or environmental assessment purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Dames & Moore personnel before use by others.

| | |
|---|---|
| Client: Modine Heat Transfer, Inc.<br>Project Number: 27397-023-045<br>Project: TCE Investigation Former Hulett Lagoon<br>Location: Camdenton, Missouri<br>Driller: GeoEnvironmental<br>Borehole Logged By: Miesche Francis<br>Drilling Method: GeoProbe®<br>Date Installed: October 11, 1996<br>Surface Conditions: Grass | **PROBE ID GP-3**<br>Monitoring Well Data: Pipe: Screen: Slot: Sand:<br>Elevation: Datum: Ground Surface: Measuring Pt: Top of Casing:<br>Sample Type<br>CT - Cuttings; SS - Split Spoon; WA - Wash Sample; CC - Continuos Core; RX - Rock Core; ST - Shelby Tube |

| DESCRIPTION | USCS | Stratigraphy | Depth (ft.) | OVM (ppm) | Completion | Sample Lab | Sample Interval | Sample Type |
|---|---|---|---|---|---|---|---|---|
| 0'-1" Top soil with organic material. | | | 0 | | GRANULAR BENTONITE | | | |
| 1"-4' CLAY, yellowish red, with cherty gravel, lower 6" wet, black discoloration at 3.5' (organic material), light gray clay lens at 4' with slight spice odor (2' of recovery). | CL | | 1 | 2.8 | | | | |
| | | | 2 | | | | | |
| | | | 3 | | | | | |
| 4'-5' CLAY, yellowish red, with cherty gravel, some areas of discoloration slight musty odor. | | | 4 | 75.4 | | Y | 4'-5' | CC |
| | | | 5 | | | | | |
| Refusal at 5'. | | | 6 | | | | | |
| | | | 7 | | | | | |
| | | | 8 | | | | | |
| | | | 9 | | | | | |
| | | | 10 | | | | | |
| | | | 11 | | | | | |
| | | | 12 | | | | | |
| | | | 13 | | | | | |
| | | | 14 | | | | | |
| | | | 15 | | | | | |
| | | | 16 | | | | | |
| | | | 17 | | | | | |
| | | | 18 | | | | | |
| | | | 19 | | | | | |
| | | | 20 | | | | | |
| | | | 21 | | | | | |
| | | | 22 | | | | | |
| | | | 23 | | | | | |
| | | | 24 | | | | | |
| | | | 25 | | | | | |

Note: This borehole was prepared for hydrogeological and/or environmental assessment purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Dames & Moore personnel before use by others.

| | |
|---|---|
| Client: Modine Heat Transfer, Inc. | **PROBE ID GP-4** |
| Project Number: 27397-023-045 | Monitoring Well Data: / Elevation: |
| Project: TCE Investigation Former Hulett Lagoon | Pipe: / Datum: |
| Location: Camdenton, Missouri | Screen: / Ground Surface: |
| Driller: GeoEnvironmental | Slot: / Measuring Pt: |
| Borehole Logged By: Miesche Francis | Sand: / Top of Casing: |
| Drilling Method: GeoProbe® | Sample Type |
| Date Installed: October 11, 1996 | CT - Cuttings; SS - Split Spoon; WA - Wash Sample; CC - Continuos Core; RX - Rock Core; ST - Shelby Tube |
| Surface Conditions: Grass | |

| DESCRIPTION | USCS | Stratigraphy | Depth (ft.) | OVM (ppm) | Completion | Sample: Lab | Sample: Interval | Sample: Type |
|---|---|---|---|---|---|---|---|---|
| 0'-1" Top soil with organic material. | | | 0 | | GRANULAR BENTONITE | | | |
| 1"-4' CLAY, yellowish red, with cherty gravel, moist, soft, sand lens at 4' with abundant organic material (2' of recovery). | CL | | 1 | 0.0 | | | | |
| | | | 2 | | | | | |
| | | | 3 | | | | | |
| 4'-6' CLAY, yellowish red, with cherty gravel, moist, tight. | | | 4 | 0.4 | | Y | 4'-6' | CC |
| | | | 5 | | | | | |
| Refusal at 6'. | | | 6 | | | | | |
| | | | 7 | | | | | |
| | | | 8 | | | | | |
| | | | 9 | | | | | |
| | | | 10 | | | | | |
| | | | 11 | | | | | |
| | | | 12 | | | | | |
| | | | 13 | | | | | |
| | | | 14 | | | | | |
| | | | 15 | | | | | |
| | | | 16 | | | | | |
| | | | 17 | | | | | |
| | | | 18 | | | | | |
| | | | 19 | | | | | |
| | | | 20 | | | | | |
| | | | 21 | | | | | |
| | | | 22 | | | | | |
| | | | 23 | | | | | |
| | | | 24 | | | | | |
| | | | 25 | | | | | |

Note: This borehole was prepared for hydrogeological and/or environmental assessment purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Dames & Moore personnel before use by others.

ATTACHMENT 3

ANALYTICAL REPORT

**Inchcape Testing Services**
**Environmental Laboratories**

1089 E Collins Blvd.
Richardson, TX 75081
Tel 214-238-5591
Fax 214-238-5592

# ANALYTICAL REPORT

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis
PROJECT : 27397-023 Modine Hulett Lagoon

Included in this data package are the analytical results for the sample group which you have submitted to Inchcape Testing Services for analysis. These results are representative of the samples as received by the laboratory.

The information contained herein has undergone extensive review and is deemed accurate and complete. Sample analysis and quality control were performed in accordance with all applicable protocols. Any deviations from these protocols or observations of interest are detailed in an accompanying Case Narrative. Please refrain from reproducing this report except in its entirety.

If you have any questions regarding this report and its associated materials please call your Project Manager at (214) 238-5591.

We appreciate the opportunity to serve you and look forward to providing continued service in the future.

Martin Jeffus

Martin Jeffus
General Manager

**Inchcape Testing Services**
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-1
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-1 4-6'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996
ANALYSIS METHOD : EPA 8010 /1
ANALYZED BY : JCH
ANALYZED ON : 15-OCT-1996
DILUTION FACTOR : 100
METHOD FACTOR : 10
QC BATCH NO : 4-101496

| VOLATILE HALOCARBONS | | |
|---|---|---|
| TEST REQUESTED | DETECTION LIMIT | RESULTS |
| Chloroform | 100 µg/Kg | 200 µg/Kg |
| Trichloroethene | 100 µg/Kg | 9170 µg/Kg |

| QUALITY CONTROL DATA | | |
|---|---|---|
| SURROGATE COMPOUND | SPIKE LEVEL | SPIKE RECOVERED |
| Bromofluorobenzene (SS) | 10.0 µg/Kg | 114 % |

**Inchcape Testing Services**
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-1
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-1 4-6'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996

| MISCELLANEOUS ANALYSES | | |
|---|---|---|
| TEST REQUESTED | DETECTION LIMIT | RESULTS |
| Total Solids /1 | 0.01 % | 80.5 % |
| Analyzed using ASTM D2216 mod. on 17-OCT-1996 by SAB<br>QC Batch No : 888064A | | |

**Inchcape Testing Services**
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-2
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-2 4-5.5'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996
ANALYSIS METHOD : EPA 8010 /1
ANALYZED BY : JCH
ANALYZED ON : 15-OCT-1996
DILUTION FACTOR : 100
METHOD FACTOR : 10
QC BATCH NO : 4-101496

| VOLATILE HALOCARBONS | | |
|---|---|---|
| TEST REQUESTED | DETECTION LIMIT | RESULTS |
| Trichloroethene | 100 µg/Kg | 1940 µg/Kg |

| QUALITY CONTROL DATA | | |
|---|---|---|
| SURROGATE COMPOUND | SPIKE LEVEL | SPIKE RECOVERED |
| Bromofluorobenzene (SS) | 10.0 µg/Kg | 130 % |

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-2
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-2 4-5.5'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996

| MISCELLANEOUS ANALYSES | | |
|---|---|---|
| TEST REQUESTED | DETECTION LIMIT | RESULTS |
| Total Solids /1 | 0.01 % | 73.6 % |
| Analyzed using ASTM D2216 mod. on 17-OCT-1996 by SAB<br>QC Batch No : 888064A | | |

Inchcape Testing Services
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-3
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-3 4-5'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996
ANALYSIS METHOD : EPA 8010 /1
ANALYZED BY : JCH
ANALYZED ON : 15-OCT-1996
DILUTION FACTOR : 5
METHOD FACTOR : 10
QC BATCH NO : 4-101496

| VOLATILE HALOCARBONS | | |
|---|---|---|
| TEST REQUESTED | DETECTION LIMIT | RESULTS |
| Chloroform | 5.0 µg/Kg | 9.4 µg/Kg |
| cis-1,2-Dichloroethene | 5.0 µg/Kg | 91.4 µg/Kg |
| Trichloroethene | 5.0 µg/Kg | < 5.0 µg/Kg |

| QUALITY CONTROL DATA | | |
|---|---|---|
| SURROGATE COMPOUND | SPIKE LEVEL | SPIKE RECOVERED |
| Bromofluorobenzene (SS) | 10.0 µg/Kg | 115 % |

**Inchcape Testing Services**
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-3
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-3 4-5'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996

| MISCELLANEOUS ANALYSES | | |
|---|---|---|
| TEST REQUESTED | DETECTION LIMIT | RESULTS |
| Total Solids /1 | 0.01 % | 78.7 % |
| Analyzed using ASTM D2216 mod. on 17-OCT-1996 by SAB<br>QC Batch No : 888064A | | |

**Inchcape Testing Services**
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-4
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-4 4-6'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996
ANALYSIS METHOD : EPA 8010 /1
ANALYZED BY : JCH
ANALYZED ON : 15-OCT-1996
DILUTION FACTOR : 5
METHOD FACTOR : 10
QC BATCH NO : 4-101496

| VOLATILE HALOCARBONS | | |
|---|---|---|
| TEST REQUESTED | DETECTION LIMIT | RESULTS |
| Trichloroethene | 5.0 µg/Kg | < 5.0 µg/Kg |

| QUALITY CONTROL DATA | | |
|---|---|---|
| SURROGATE COMPOUND | SPIKE LEVEL | SPIKE RECOVERED |
| Bromofluorobenzene (SS) | 10.0 µg/Kg | 122 % |

**Inchcape Testing Services**
Environmental Laboratories

DATE RECEIVED : 12-OCT-1996

REPORT NUMBER : D96-11513-4
REPORT DATE : 22-OCT-1996

SAMPLE SUBMITTED BY : Dames & Moore
ADDRESS : 2135 East Sunshine, Suite #150
: Springfield, MO 65804
ATTENTION : Miesche Francis

SAMPLE MATRIX : Soil
ID MARKS : GP-4 4-6'
PROJECT : 27397-023 Modine Hulett Lagoon
DATE SAMPLED : 11-OCT-1996

MISCELLANEOUS ANALYSES

| TEST REQUESTED | | DETECTION LIMIT | RESULTS |
|---|---|---|---|
| Total Solids | /1 | 0.01 % | 72.4 % |

Analyzed using ASTM D2216 mod. on 17-OCT-1996 by SAB
QC Batch No : 888064A

**Inchcape Testing Services**
Environmental Laboratories

REPORT DATE : 22-OCT-1996 REPORT NUMBER : D96-11513

SAMPLE SUBMITTED BY : Dames & Moore
ATTENTION : Miesche Francis
PROJECT : 27397-023 Modine Hulett Lagoon

LABORATORY QUALITY CONTROL REPORT

| | |
|---|---|
| ANALYTE | Trichloroethene |
| BATCH NO. | 4-101496 |
| LCS LOT NO. | AB709-55B |
| PREP METHOD | --- |
| PREPARED BY | --- |
| ANALYSIS METHOD | EPA 8010 |
| ANALYZED BY | JCH |
| UNITS | mg/Kg |
| METHOD BLANK | < 1.00 |
| SPIKE LEVEL | 500 |
| MS RESULT | 470 |
| MS RECOVERY % | 94.0 |
| MSD RESULT | 420 |
| MSD RECOVERY % | 84.0 |
| MS/MSD RPD % | 11.2 |
| BS RESULT | NA |
| BS RECOVERY % | NA |
| BSD RESULT | NA |
| BSD RECOVERY % | NA |
| BS/BSD RPD % | NA |
| DUPLICATE RPD % | NA |
| LCS LEVEL | 20.0 |
| LCS RESULT | 16.5 |
| LCS RECOVERY % | 82.5 |
| SPIKE SAMPLE ID | 11513-3 |
| DUP SAMPLE ID | --- |

NA Not applicable

**Inchca Testing Services** Environmental Laboratories 1089 East Co Blvd., #100 Richardson, TX 75081 (214) 238-5591 CHAIN OF CUSTC ECORD

**Report to:**
Company: Dames & Moore
Address: 2135 E Sunshine #105 Springfield, MO 65804
Contact: Miesche Francis
Phone: (417) 881-3927
Fax: (417) 881-6361

**Invoice to**
Company:
Address: Same as
Contact:
Phone: report.
PO/SO #:

ANALYSIS REQUESTED: VOCS 8010 (TCE)

Lab use only
Due Date:
Temp of coolers when received (C°). 1 2 3 4 5
Custody Seal N / Y
Intact N / Y
Screened For Radioactivity

Sampler's Name: Miesche Francis
Sampler's Signature: Miesche Francis

Proj. No: 27397-023
Project Name: Modine Hulett Lagoon

| Matrix[1] | Date | Time | Comp | Grab | Identifying Marks of Sample(s) | VOA | A/G 1 Lt | 250 ml | P/O | VOCS 8010 (TCE) | Lab Sample ID (Lab Use Only) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 10-11 | 1145 | | V | GP-1 4'-6' | | | | V1 | ✓ | 11513-1 | Report only |
| S | 10-11 | 1230 | | ✓ | GP-2 4-5½' | | | | V1 | ✓ | -2 | TCE unless |
| S | 10-11 | 1211 | | V | GP-3 4-5 | | | | V1 | ✓ | -3 | other constituents |
| S | 10-11 | 1230 | | V | GP-4 4-6' | | | | V1 | ✓ | -4 | are identified |
| | | | | | | | | | | | | in significant |
| | | | | | | | | | | | | quanties. |

ORIGINAL

Turn around time ☑ Priority 1 or Standard ☐ Priority 2 or 50% ☐ Priority 3 or 100% ☐ Priority 4 ERS * * BTEX (602/8020), TPH (418 1 or 8015), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010)

| Relinquished by: (Signature) | Date | Time | Received by (Signature) | Date | Time | Remarks |
|---|---|---|---|---|---|---|
| Miesche Francis | 10/11 | 1430 | D. Mills | 10-12 | 1000 | * SEE ABOVE |
| Relinquished by: (Signature) | Date: | Time | Received by: (Signature) | Date | Time | |
| Relinquished by (Signature) | Date | Time | Received by (Signature) | Date | Time | Client's delivery of samples constitutes acceptance of Inchcape/ITS-Dallas terms and conditions contained in the Price Schedule |

[1] Matrix WW - Wastewater W - Water S - Soil SD - Solid L - Liquid A - Air Bag C - Charcoal tube SL - Sludge O - Oil
[2] Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other

**Inchcape cannot accept verbal changes. Please Fax written changes to 214-238-5592**

**OFFICE USE ONLY**

FILE Former Hulett LagoonPA/SI Site
CamdenCounty

Former Hulett Lagoon Site
Combined PA/SI
Reference 43

STATE OF MISSOURI
Mel Carnahan Governor • Stephen M. Mahfood Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGY AND LAND SURVEY
P O Box 250 111 Fairgrounds Rd Rolla, MO 65402-0250
(573) 368-2100
FAX (573) 368-2111

STATE OF MISSOURI
NEIL M. ELFRINK
RG0057
REGISTERED GEOLOGIST

March 29, 1999
p 1 of 12

## MEMORANDUM

DATE: March 29, 1999

TO: Valerie Wilder, Environmental Specialist
Superfund Section, HWP, DEQ

FROM: Neil Elfrink, Geologist
Environmental Geology Section, GSP, DGLS

SUBJECT: Hydrogeologic Report for the Former Hulett Lagoon Site

LOCATION: SW 1/4, SW 1/4, SW 1/4, Section 24, T. 38 N., R. 17 W., Camden County, Missouri; 38° 00' 42" North Latitude and 92° 45' 18" West Longitude.

The hydrogeologic report for the Former Hulett Lagoon site is enclosed. Please contact me at (573) 368-2162 if you have any questions regarding this report, or if additional information is required.

NE/lh

Attachments

# HYDROGEOLOGIC REPORT FOR THE FORMER HULETT LAGOON SITE
# CAMDENTON, MISSOURI, CAMDEN COUNTY

## GENERAL CONSIDERATIONS

### Site Location

The Former Hulett Lagoon site is located on the Green Bay Terrace 7.5-minute quadrangle map (Figure 1), in the Southwest Quarter (SW 1/4) of the Southwest Quarter (SW 1/4) of the Southwest Quarter (SW 1/4) of Section 24, Township 38 North, Range 17 West. Coordinates for the center of the former lagoon are approximately 38° 00' 42" north latitude and 92° 45' 18" west longitude. The Former Hulett Lagoon site is located on the east side of Dawson Road, north of Sunset Drive. The site is approximately ¼ mile northeast of Modine Manufacturing Site (Modine).

### Physiographic Province

The site is situated on the Salem Plateau region of the Ozark Plateau physiographic province (Missouri Water Atlas, 1986). The topography of the Salem Plateau is characterized by a rolling upland surface with rugged hills dissected by entrenched, narrow stream valleys (Gann, 1976). Karst features, such as springs, sinkholes, and losing streams, are characteristic of the Salem Plateau.

## GROUNDWATER PATHWAY

### Stratigraphic Units

A stratigraphic column (Table 1) has been tabulated based upon the stratigraphy of nearby wells (Well Log File, 1999).

The youngest bedrock formations beneath the site are expected to be Ordovician-age sediments assigned to the Canadian Series. The Roubidoux Formation consists of dolomite, sandy dolomite, and sandstone (Thompson, 1991). In the Camdenton area, soluble portions of the Roubidoux have generally been removed by dissolution. Nearby well logs indicate that the Roubidoux Formation may have been completely removed by erosion in the vicinity of the site.

Underlying the Roubidoux Formation, the Gasconade Dolomite consists of cherty dolomite and is estimated to be approximately 300 feet thick in the vicinity of the site (Well Logs, 1999). A basal unit of the Gasconade Dolomite, known as the Gunter Sandstone Member, commonly separates the Ordovician- and Cambrian-age strata. The Gunter Sandstone is approximately 25 feet thick in the Camdenton area.

Cambrian rocks in the Camdenton area were deposited in a complex depositional environment. Camdenton is located near the western margin of a Cambrian-age intrashelf sedimentary basin known as the Central Missouri Basin (Palmer and Hayes, 1997). To the west lies the north-south trending Lebanon Arch, which consists of carbonate platform rocks, that in some areas, thin over Precambrian highlands (Gregg et. al., 1989). Dramatically different lithologies and abrupt facies changes are depicted in area well logs (Figure 2). In general, more shaly, basinal rocks to the east pinch-out against the Lebanon Arch.

Because of the tectonic setting, Cambrian beds in the Camdenton area are difficult to categorize, and "layer-cake" stratigraphy should not be assumed. The following descriptions are simplified. The upper-most Cambrian unit in the area is the Eminence Dolomite, which consists of approximately 300 – 635 feet of dolomite with minor amounts of chert. The Eminence Dolomite is underlain by about 25 - 230 feet of Potosi Dolomite, which consists of dolomite, chert, and drusy quartz. Beneath the Potosi Dolomite, in descending order, are the Derby-Doerun Dolomite, the shaly Davis Formation, the Bonneterre Formation, and the Lamotte Sandstone. The entire Cambrian section is estimated to be over 1,150 feet thick.

Cross-sections constructed using information from specific well logs (Well Log Files, 1999) are presented in Figures 2 and 3. The cross-section locations are shown on Figures 1 and 4.

**Aquifers**

The Ozark Aquifer, which includes all bedrock units above the Cambrian-age Derby-Doerun Dolomite, is the shallowest aquifer beneath site. The Ozark Aquifer is considered exposed at the surface at the Former Hulett Lagoon Site. The total thickness of the aquifer is approximately 950 feet. Each of the units which comprise the Ozark Aquifer have individual characteristics that control their water-bearing capabilities; however, in general, the Ozark Aquifer produces good-quality water, with production rates generally proportional to well depth. Extensive pumping of groundwater in the Camdenton area has created a downward vertical gradient, and the site is located in a groundwater recharge zone.

Because detailed hydrogeologic studies have not been conducted at the site, groundwater flow directions within the bedrock can only be approximated. Prior to pumping of the aquifer, groundwater beneath the site probably flowed westward or northward to discharge areas in the Niangua River valley, (Imes, 1990, Sheet 3). Pumping rates at the Camdenton municipal wells are high enough to engulf the site within the cones of depression that surround the municipal wells. The radius of influence of nearby production wells should be determined.

Groundwater flow in the saturated zone is controlled by gradient. Assertions that preferential pathways in the Ozark Aquifer substantially influence flow direction in the saturated zone (Dames and Moore, 1996; page 13) are incorrect. Water flows downhill; fractures or solution-enlarged channels cannot make water flow uphill. Monitoring well nests are needed to accurately determine the magnitude of the downward vertical gradient. The upper Gasconade Dolomite *may* inhibit the downward migration of contamination. However, fracturing and karst development may have resulted in a local increase in permeability within the otherwise relatively tight upper Gasconade Dolomite.

The Gunter Sandstone is generally highly porous and permeable and is an important source of domestic groundwater supplies in the area. Because the Gunter Sandstone generally yields adequate domestic water supplies, few private wells in the area penetrate the underlying Cambrian Formations. However, municipal wells in the Lake of the Ozarks area are generally cased through the Gunter Sandstone, in order to avoid possible bacterial contamination.

The Eminence and Potosi Dolomites are a major source of municipal drinking water throughout the Ozark area, including the City of Camdenton. The Eminence Dolomite is differentiated from the underlying Potosi Dolomite by the lack of druse. A druse is a rock cavity encrusted with finely crystalline quartz. The druse-rich Potosi Dolomite is the most permeable geologic unit within the Ozark Aquifer and generally has an extensive network of karstic channels.

The shallowest reliable aquitard beneath the site is the St. Francois Confining Unit, approximately 1,200 feet below the surface. The St. Francois Confining Unit separates the Ozark Aquifer from the deeper St. Francois Aquifer. The St. Francois Aquifer includes the Cambrian-age Bonneterre Formation and Lamotte Sandstone. The St. Francois Aquifer is not used as a water source in Camden County. Water losses in the Lamotte Sandstone are common in some parts of the Ozark Region, although the phenomenon is poorly understood. Outside the Cambrian outcrop area, few water wells penetrate the Lamotte Sandstone, since yields may actually be reduced. Groundwater flow directions in the deeper St. Francois Aquifer are generally unknown and may be complicated.

Baseline water-level and pumping rate data needs to be collected before informed decisions about groundwater movement in the Camdenton subsurface can be made. Static water levels should be measured at least monthly at any inactive wells. Detailed records of active wells should include volume of water pumped, length of pumping cycles, and drawdown measurements. The Mulberry City Well (which was shut down on January 26, 1999 because of TCE contamination) produced approximately three times the volume of the other two city wells, suggesting the aquifer is highly heterogeneous. The Mulberry Well probably intercepted more solution-enlarged cavities than the other city wells, although lithologic differences can also explain differences in well yield. Wide variations in aquifer parameters are common in

carbonate areas.

The three Camdenton city wells produced a total of 232,458,000 gallons in 1997. An estimate of the cone of depression produced by this pumping can be made by comparing Camdenton to the city of Rolla, which is located in a similar ridge-top geologic setting approximately 50 miles east of Camdenton (Vandike, 1992). In 1960, four Rolla city wells produced approximately 290,250,000 gallons of water from the Ozark Aquifer. The resulting cone of depression was over five miles wide (Vandike, 1992). By 1960, pumping of the Ozark Aquifer in the Rolla area had dropped water levels up to 150 feet compared to the predevelopment potentiometric surface. The relatively deep depth to groundwater in the Camdenton area suggests a similar radius of effect can be expected. Any potential site-related contaminants reaching the water table are expected to move toward the nearest Camdenton City Well. Until recently, hydraulic control beneath the Former Hulett Lagoon and Modine sites has been maintained by pumping at the Mulberry Well. Now that the Mulberry Well has been shut off, TCE contamination is expected to move toward another city well.

Wells at the Modine site are open to different depth intervals. Therefore, data from these wells cannot be used to create a potentiometric map. The fact that two of the four wells have gone dry in the past suggests that the vertical flow component is significant. Water levels in area wells tend to decrease with depth, supporting the statement that the vertical flow is downward. As previously mentioned, a downward gradient is to be expected in an active municipal well field, particularly if it is located on a ridge top. Static water levels measured during the construction of the newest Camdenton City Well (# 7) also verify the downward gradient (Krehbiel Engineering, Inc., 1998). The Hickory Street Well is 1,100 feet deep with 462 feet of casing. The static water level before pressure-grout sealing of the well casing was 222 feet below the ground surface. Static water level after sealing was 260 feet below ground surface, indicating a downward vertical gradient. A large upland area that might provide recharge to the Camdenton City Wells does not exist. Groundwater monitored by the monitoring wells is essentially moving downward to recharge the pumping wells. Conclusions about lateral flow directions cannot be made based on water levels from the existing monitoring well network.

It has been suggested that contaminants reaching the saturated zone beneath Camdenton will follow "regional groundwater flow" and discharge at the Lake of the Ozarks (Dames & Moore, 1998; page 19). However, groundwater withdrawals averaging over 500,000 gallons per day will create a large cone of depression and obliterate "regional groundwater flow" in any Ozark ridge top setting. A 2-hour pump test of the new Hickory St. Well at 550 gpm caused a 176-foot drawdown in water level (Krehbiel Engineering, Inc., 1998). There is no evidence to suggest that potential contaminants reaching the water table from either the Former Hulett Lagoon or the Modine site can somehow escape the Camdenton well field.

## Aquifer Discontinuities

Minor folds and faults in the area cannot be considered aquifer discontinuities. However, it should be noted that the Cambrian-age formations that form the most productive portions of the Ozark Aquifer beneath the site are highly variable in lithology. The aquifer cannot be considered isotropic, nor does it possess radial symmetry. Aquifer parameters may be so variable as to render groundwater modeling useless.

## Wellhead Protection Area

The Former Hulett Lagoon site is located in a Wellhead Protection Area according to section 1428 of the Safe Drinking Water Act. In Missouri, Wellhead Protection Areas are designated by the Missouri Wellhead Protection Program. The Former Hulett Lagoon Area site is located within a 1-mile radius of a wellhead in a carbonate aquifer system (Public Drinking Water Program, 1994, page 15).

Revisions to the 1994 Missouri Wellhead Protection Program document are currently under review by EPA. However, the Former Hulett Lagoon site should remain in a designated Wellhead Protection Area under any new management program that may be approved.

In addition to the Wellhead Protection Area discussed above, Camdenton is also subject to Well Construction Rules under the Water Well Drillers Act, section 256.600 to 256.640 RSMo. Most of the Camdenton area is located in Area 1, as designated by the DGLS Wellhead Protection Section. Since September 1987, Area 1 bedrock wells have been required to have 80 feet of casing and penetrate at least 30 feet of bedrock. Wells within ¼ mile of the Lake of the Ozarks are located in Sensitive Area B and subject to additional requirements (Missouri Well Construction Rules, 1996).

## Karst Features

The Camdenton area is considered karst (Missouri Water Atlas, 1986). Significant karst features are present within a 4-mile radius of the site. A monitoring well drilled at the site encountered numerous fractures and small voids (Dames & Moore, 1998). Over 5,000 gallons of water was lost during the drilling of the monitoring well.

## Geologic Structures

Geophysical logging of monitoring wells at the Modine site suggests that formations beneath the site are essentially flat-lying. Small faults and folds have been mapped within a 4-mile target radius. The axis of a northwest-trending syncline, called the

Racetrack Hollow Syncline, has been mapped less than 2 miles south of the site (Brown, 1984). The Red Arrow Fault is located approximately 3 miles south of the site (Wedge, in preparation). The fault strikes northwest and, in general, the southwest side is downthrown approximately 100 feet. However, geology along the fault zone is complicated. LOGMAIN Well # 25162 (Figure 3) is located along the fault zone and indicates significant upward movement. Ha Ha Tonka Spring is located along the trace of The Red Arrow Fault.

The poorly defined Proctor anticline runs across Camden County (McCracken, 1971). The anticline is evident on the regional cross-section (Figure 3). The Proctor anticline roughly corresponds with the Lebanon Arch, an area of shallow-water carbonate deposition during the Cambrian Period. The anticline is probably related to a rejuvenated Precambrian fault. The effects of the structural deformation on groundwater are poorly understood, but the faulting and folding has probably increased hydraulic conductivities in some areas. Groundwater may flow along conduits within the structures.

### Travel Time Factor

Rock layers that underlie the site are karst. The resulting Travel Time Factor Value is 35 (Federal Register, 1990).

## GROUNDWATER TARGETS

### Target Distance Limit

Groundwater use within the 4-mile groundwater target distance limit is extensive. The City of Camdenton has provided water service since 1952, with groundwater as the sole source of water. Most businesses and residences near the Former Hulett Lagoon site utilize on city water.

### Wells

Over 195 well locations within the groundwater target distance limit are recorded in the databases available at the Division of Geology and Land Survey. The LOGMAIN database contains information on older wells. The DGLS Well Wellhead Protection Section's Water Well Information System (W.I.M.S) database contains information on wells drilled since 1987. Well site locations are presented on Figures 5 and 6, and the corresponding well data is tabulated in Table 2. Some locations may be estimated or based on section centroids. The vast majority of the wells on record are domestic supply wells. Some wells may no longer be active. Many active wells may not be recorded in DGLS databases.

According to databases available at DGLS, one private well is located with ¼ mile of the Former Hulett Lagoon Site. One community well is located with ½ mile of the Former Hulett Lagoon Site. A total of 4 wells are located between 0.5 and 1 mile of the site, including 2 community wells and 2 private wells. An additional 31 wells are located between 1 and 2 miles from the site, including 1 community well, 1 nontransient noncommunity well, 2 transient noncommunity wells and 27 private wells. 72 wells are located between 2 and 3 miles from the site, including 2 community wells, 1 nontransient noncommunity well, 9 transient noncommunity wells and 60 private wells. 96 wells are located between 3 and 4 miles of the site including 3 nontransient noncommunity well, 3 transient noncommunity wells and 90 private wells.

### Nearest Wells

The nearest public drinking water supply well on record is The City of Camdenton Well #6 (Mulberry Well), located about 1/4 mile south of the Former Hulett Lagoon site. The well was closed in 1999 due to TCE contamination. The City of Camdenton has three other wells inside the 4-mile target distance limit. Total production from the three wells was 221,003,300 gallons in 1993. All of these wells draw water from the Ozark Aquifer.

The nearest possible private drinking water well on record is located approximately 1/4 mile east of the Former Hulett Lagoon site (Figure 5). The well was drilled in 1990 and its current status is unknown.

## SURFACE WATER PATHWAY

### Hydrologic Setting

The Former Hulett Lagoon site is situated near the headwaters of a small unnamed stream which drains southwest to the Niangua Arm of the Lake of the Ozarks. The site of the former lagoon has been leveled, while the surrounding terrain exhibits moderate natural relief (5% to 9% slopes). East of the site lies the City of Camdenton. West of the site, the landscape is more rugged, and forests extend down to the Lake of the Ozarks. The natural landforms and drainage patterns at the site have been obscured by lagoon construction and, later, by soil removal actions. Land use patterns for the surrounding upland areas near the Former Hulett Lagoon site include residential properties with some light-industrial and commercial use.

### Rainfall Data

The average annual precipitation in the area of the Former Hulett Lagoon site is slightly more than 37 inches. Average annual run-off is around 10 inches, and

evapotranspiration amounts to about 28 inches per year; therefore, little precipitation is available for infiltration (Vandike, 1995). The 2-year, 24-hour rainfall for the area is about 3.5 inches (Rainfall Frequency Atlas, undated).

**Surface Water Migration Path**

Below the Former Hulett Lagoon Site, the receiving stream is fairly steep and the bedload consists mostly of cobbles and gravels. Any metals or solvents that may have reached the stream are unlikely to be detected in the sediments. Groundwater contamination is the main concern at the Former Hulett Lagoon Site.

In 1992 James Vandike, a DGLS geologist with the Water Resources Program, examined area streams as part of the Modine investigation (Vandike, March 18, 1992). The Former Hulett Lagoon site is located on the valley floor of an intermittent stream referred to by Van Dike as the "northeast branch" of an unnamed tributary to Jarvis Hollow (Figure 1). The "southeast branch" of the tributary drains the Modine site. The northeast and southeast branches join near the western corporate boundary of the City of Camdenton, approximately 0.6 miles downstream of the Former Hulett Lagoon Site. The lagoon was constructed near the headwaters of the northeast branch, just west of the ridge top where most of Camdenton is located. Water runs onto the site from the upper section of the northeast branch. This channel has been diverted around the northern edge of the former lagoon; thus, only the southern slope of the valley provides surface runoff to the site. The assigned Hazard Ranking System (HRS) Drainage Area Value is 1 (Federal Register, 1990).

Run-off from the site enters the northeast branch and flows toward the west for ¼ mile. Runoff then flows southwest approximately 1.6 miles and enters Jarvis Hollow in the NE ¼, NE ¼, SE1/4 of Section 34, Township 38 North, Range 17 West. According to the 7.5 minute Hahatonka topographic map, the 0.15-mile-long stream segment below this confluence appears to be perennial. Thus, the confluence of the unnamed tributary and the stream in Jarvis Hollow is considered the probable point of entry (PPE) to surface water. If the short stream segment is not perennially flowing, the PPE would then be located at the mouth of Jarvis hollow, where the stream enters the Lake of the Ozarks. Runoff from the Former Hulett Lagoon reaches the Lake of the Ozarks approximately 1.97 miles downstream of the site. Figure 1 illustrates drainage patterns and overland flow directions in the vicinity of the site.

The 1983 Green Bay Terrace 7.5-minute topographic map does not distinguish perennial from intermittent streams. All streams are shown as solid blue lines. However, the 1959 Green Bay Terrace map depicts the unnamed tributary that drains the site as intermittent.

Vandike noted that the unnamed tributary lost flow in some locations, especially when encountering the Gunter Sandstone. However, Vandike anticipated that any flow lost in

the streambed would stay in the valley. He noted that very little rainfall was necessary to generate surface flow throughout the reach of the stream. The receiving stream for the Former Hulett Lagoon Site has not been officially classified by DGLS, but based on available reports, the stream should be considered losing. The Gasconade Dolomite that forms much of the stream bed is not particularly karst. Many nearby streams have been classified as losing (Losing Stream File, 1999).

The 15-mile downstream limit (Figure 4) ends near Shepard Cove on the Osage River Arm of the Lake of the Ozarks, approximately 29.5 miles above Bagnell Dam. This point is located on the Camdenton, MO 7.5-minute quadrangle; SE ¼, Section 24, T. 39 N., R. 17 W. The Osage River flows in a north-easterly direction, toward the Missouri River.

## SURFACE WATER TARGETS

### Drinking Water Intakes

No known direct intake of stream water is located within 15 downstream miles of the PPE (Hahatonka, Green Bay Terrace, and Camdenton Quadrangles; DuCharme and Miller, 1996; and Inventory of Missouri Public Water Systems, 1997). The 15-mile surface water target distance limit is shown on Figure 4.

## SOIL / AIR PATHWAY

Contaminated soils at the Former Hulett Lagoon were trucked off to the Camdenton Sludge Disposal Area in 1988. Potential downstream or downwind receptors are not likely to be affected by the Former Hulett Lagoon Site itself.

The native soil in the vicinity of the Former Hulett Lagoon site was the Clarksville-Gepp very cherty silt loam (Wolf, 1994). The Clarksville-Gepp soils are deep, well-drained soils typical of sloping uplands. Permeability is moderate. The content of organic material is moderately low. The shrink-swell potential is moderate. Grass at the site limits wind erosion.

The HRS Soil Group Designation from Table 4-4 is B (Federal Register, 1990).

## REFERENCES

Anderson, K. H., et. al., Geologic Map of Missouri. Missouri Department of Natural Resources, Division of Geology and Land Survey, 1979, 1 sheet.

Brown, James C., unpublished geologic map of the Hahatonka 7.5-Minute Quadrangle, SP-8426. Missouri Department of Natural Resources, Division of Geology and Land Survey, 1984, 1 sheet.

Camdenton 7.5-Minute Topographic Quadrangle. Department of the Interior, United States Geological Survey, 1983, 1 sheet.

Dames & Moore, Summary Report of Investigative and Remedial Activities Conducted to Achieve Closure of the Interim TSD Facility Modine Manufacturing Company Camdenton, Missouri, October 9, 1998, 33 pages and 17 figures.

Dames & Moore, Final Report of Fracture System Investigation, Modine Heat Transfer, Inc., Camdenton, Missouri, July 17, 1996, 13 pages and 11 figures.

Decaturville 7.5-Minute Topographic Quadrangle. Department of the Interior, United States Geological Survey, 1975, 1 sheet.

DuCharme, C. B. and T. M. Miller, Missouri State Water Plan Series, Volume IV: Water Use of Missouri. Missouri Department of Natural Resources, Division of Geology and Land Survey, 1996, 150 pages.

Federal Register, Volume 55, No. 241, Friday, December 14, 1990.

Gann, E. E., Water Resources of South-Central Missouri, Hydrologic Investigations Atlas HA-550. Department of the Interior, United States Geological Survey, 1976, 4 sheets.

Green Bay Terrace 7.5-Minute Topographic Quadrangle. Department of the Interior, United States Geological Survey, 1983, 1 sheet.

Green Bay Terrace 7.5-Minute Topographic Quadrangle. Department of the Interior, United States Geological Survey, 1959, photorevised 1982, 1 sheet.

Gregg, J. M., J. R. Palmer, and V. E. Kurtz, Field Guide to the Upper Cambrian of Southeastern Missouri: Stratigraphy, Sedimentology, and Economic Geology. Department of Geology and Geophysics, University of Missouri, Rolla MO 65401, 1989.

Guidance for Performing Preliminary Assessments Under CERCLA, EPA/540/G-91/013, Publication 9345.0-01A, September 1991.

Hahatonka 7.5-Minute Topographic Quadrangle. Department of the Interior, United States Geological Survey, 1982, 1 sheet.

Harvey, E. J., John Skelton, and D. E. Miller, Hydrology of Carbonate Terrane – Niangua, Osage Fork, and Grandglaize Basins, Missouri, Water Resources Report 35, Missouri Department of Natural Resources, Division of Geology and Land Survey, 1983.

Imes, J. L., Major Geohydrologic Units in and Adjacent to the Ozark Plateaus Province, Missouri, Arkansas, Kansas, and Oklahoma, U.S. Geological Survey Hydrologic Investigations Atlas HA-711-A, scale 1:750,000, 1991, 1 sheet.

Imes, J. L., Major Geohydrologic Units in and Adjacent to the Ozark Plateaus Province, Missouri, Arkansas, Kansas, and Oklahoma - Ozark Aquifer, U.S. Geological Survey Hydrologic Investigations Atlas HA-711-E, scale 1:750,000, 1990, 3 sheets.

Inventory of Missouri Public Water Systems, 1997. Missouri Department of Natural Resources, 210 pages, 1997.

Krehbiel Engineering, Inc., Transmittal concerning the public-water-supply well on Hickory St., Camdenton, Missouri, (Including copies of pump test data and the pressure grout survey); addressed to James Vandike DNR-DGLS Water Resources Program, September 3, 1998.

Losing Stream File. Missouri Department of Natural Resources, Division of Geology and Land Survey, February, 1999.

McCracken, Mary H., Structural Features of Missouri, Report of Investigation Number 49. Missouri Geological Survey and Water Resources, 1971.

Missouri Water Atlas. Missouri Department of Natural Resources, Division of Geology and Land Survey, 1986.

Missouri Water Resources Law - Annual Report, Water Resources Report Number 52. Missouri Department of Natural Resources, Division of Geology and Land Survey, 1996, 30 pages.

Missouri Well Construction Rules, Private Water Wells, Heat Pump Systems, Pump Installations and Monitoring Wells, Authorizing Statutes – 256.600 to 256.640 RSMo, Missouri Department of Natural Resources, Division of Geology and Land Survey, 1996.

Missouri Wellhead Protection Program, Missouri Department of Natural Resources, Division of Environmental Quality, Public Drinking Water Program, December, 1994.

Palmer, J. R and Hayes, T. S., Maps Showing Locations of Known Mississippi Valley-Type Deposits and Occurrences in the Ozark Mountains Region Relative to Late

Cambrian Shaly Lithofacies and Other Shales, Missouri, Arkansas, Kansas, and Oklahoma. U.S. Geological Survey Miscellaneous Field Studies Map MF-1994-F, 1997.

Rainfall Frequency Atlas of the United States, Technical Paper Number 40. United States Department of Commerce, undated.

Soil Survey of Camden County, Missouri, United States Department of Agriculture Soil Conservation Service in cooperation with Missouri Agricultural Experiment Station, April 1989.

Thompson, Thomas L., Paleozoic Succession in Missouri- Part 2, Ordovician System, Report of Investigations Number 70. Missouri Department of Natural Resources, Division of Geology and Land Survey, 1991.

Vandike, J. E., Missouri State Water Plan Series, Volume 1: Surface Water Resources of Missouri, Water Resources Report Number 45. Missouri Department of Natural Resources, Division of Geology and Land Survey, 1995, 122 pages.

Vandike, J. E., A Hydrologic Analysis of the Ozark Aquifer in the Rolla Area, Missouri, Water Resources Report Number 41. Missouri Department of Natural Resources, Division of Geology and Land Survey, 1992, 84 pages.

Vandike, J. E., Memorandum to Mimi Garstang, Chief, Waste Management Unit, DGLS; Subject: Hydrolocic investigation of the Sundstrand (Modine) site area, Camden County, MO; Missouri Department of Natural Resources, Division of Geology and Land Survey, March 18, 1992, 3 pages.

Water Resources Data, Missouri Water Year 1989, U.S. Geological Survey Water-Data Report MO-89-1. Department of the Interior, United States Geologic Survey, 1990, 354 pages.

Wedge, Keith, Structural Features of Missouri. Missouri Department of Natural Resources, Division of Geology and Land Survey, in preparation.

Well logs for the Camdenton area on file at DGLS, March, 1999.

Wolf, David W., Soil Survey of Camden County, Missouri. U.S. Department of Agriculture, Soil Conservation Service, 1994, 127 pages.

## Table 1. Stratigraphic Column for Former Hulett Lagoon, Camden County (after Harvey et. al.,1983)

| System | Aquifer Group | Approximate Site – Specific Thickness (ft) | Formation | Hydraulic Conductivity (cm/sec) | Regional Thickness (ft) | Dominant Lithology | Water-bearing Character |
|---|---|---|---|---|---|---|---|
| Quaternary | | 8 | Colluvium and residuum | | 0-90 | Regolith of residual clay, sand, chert pebbles and cobbles | May contain small amounts of perched water. |
| Ordovician | Ozark Aquifer | 0? | Roubidoux Formation | $10^{-3}$ | 0-90 | Clayey residuum, sandstone and sandy dolomite | Not present in sufficient thickness in the Camdenton area to produce usable quantities of water. |
| | | 300 | Gasconade Dolomite | $10^{-6}$ | 300-385 | Cherty dolomite, minor sandstone, and shale | Yields moderate to large quantities of water to wells. Yields range from 20 to 75 gpm. Less-permeable Upper Gasconade may act as a leaky confining unit. |
| | | 25 | Gunter Sandstone Member | $10^{-4}$ | 10-45 | Sandstone | Contributes moderate to large quantities of water. Most wells open to other formations. |
| Cambrian | | 500? | Eminence Dolomite | $10^{-5}$ | 240-600? | Cherty dolomite | Yields 6-100 gpm, the average being about 20 gpm |
| | | 150? | Potosi Dolomite | $10^{-4}$ | 30-330 | Dolomite; contains abundant quartz druse | Yields large quantities of water to wells. Yields range from 100 to 750 gpm. |
| | St. Francois Confining Unit | 180 | Derby-Doerun Dolomite | $10^{-7}$ | 80?-215 | Shaley dolomites and shale | Reliable aquitard. |
| | | 80 | Davis Formation | $10^{-7}$ | 50-380? | | |
| | St. Francois Aquifer | 160 | Bonneterre Formation | $10^{-5}$ | 85-200 | Dolomite and limestone | Generally used only in outcrop areas. May contribute additional 100-200 gpm to wells open to other formations. |
| | | 240 | Lamotte Sandstone | $10^{-5}$ | 140-300 | Sandstone and arkosic conglomerate | |
| Precambrian | Basement Confining Unit | | | | | Igneous and metamorphic rocks | Does not yield water to wells in this area |

# able 2: Former Hulett Lagoon (PA/SI), Camden County, Missouri

Wells located 0 to 0.25 Miles from the Former Hulett Lagoon

| Source | Well ID | Depth | CSG | Q1 | Q2 | Q3 | SEC | TWN | RNG | Elev | SWL | Date | Use | Owner | Aquifer | PWSSIDEXT ID# | GPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0 to 0.25 Miles** | | | | | | | | | | | | | | | | | |
| WIMS | 0054495A | 407 | 105 | | SE | SW | 24 | 38N | 17W | 0 | 0 | 10/17/90 | Private Well | PRICE | Ozark | | 0 |
| **0.25 to 0.5 Miles** | | | | | | | | | | | | | | | | | |
| PDWP | 40376 | 900 | 400 | SW | NE | NW | 25 | 38N | 17W | | 95 | 1986 | Community | CITY OF CAMDENTON #6 - Mulberry | Ozark | 3010130103 | 600 |
| **0.5 to 1 Mile** | | | | | | | | | | | | | | | | | |
| LOGMAIN | 27877 | 1060 | 400 | NE | NW | NE | 25 | 38N | 17W | 1010 | 315 | 1974 | Community | CITY OF CAMDENTON #4 - Blair | Ozark | 3010130102 | 300 |
| WIMS | 0019268A | 1100 | 463 | SE | SE | SE | 24 | 38N | 17W | 1024 | 260 | 11/16/98 | Community | CITY OF CAMDENTON #7 - Hickory | Ozark | | 550 |
| WIMS | 0068392A | 400 | 220 | NE | SW | SE | 23 | 38N | 17W | 230 | 220 | 11/13/91 | Private Well | | Ozark | | 30 |
| WIMS | 0084612A | 420 | 100 | | SW | SE | 23 | 38N | 17W | 0 | 210 | 4/27/92 | Private Well | HULETT | Ozark | | 30 |
| **1 to 2 Miles** | | | | | | | | | | | | | | | | | |
| LOGMAIN | 20180 | 1020 | 450 | SE | SE | NE | 25 | 38N | 17W | 1036 | 254 | 1961 | Community | CITY OF CAMDENTON #3 - Rodeo | Ozark | 3010130101 | 325 |
| LOGMAIN | 26540 | 600 | 403 | NW | SE | SW | 14 | 38N | 17W | 1006 | 165 | 1969 | Nontransient | PROF NURSING HOME OF AM. | Ozark | | 140 |
| LOGMAIN | 28665 | 725 | 235 | | | | 22 | 38N | 17W | 0 | | 1987 | Transient | MO.DEPT.CONSERVATION #2 | Ozark | | |
| PDWP | 41987 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Transient | Lake Dental Clinic | Ozark | 3238244101 | 0 |
| WIMS | 0002076A | 251 | 127 | | | SE | 04 | 30N | 19W | 0 | 90 | 8/14/87 | Private Well | GALLAGHER, SR | Ozark | | 33 |
| WIMS | 0004240A | 0 | 0 | | | | 30 | 38N | 16W | 0 | 0 | 10/20/87 | Private Well | DIAL | Ozark | | 0 |
| WIMS | 0005180A | 282 | 84 | | NE | NW | 22 | 38N | 17W | 0 | 120 | | Private Well | STINER | Ozark | | 20 |
| WIMS | 0005184A | 175 | 170 | | SW | SE | 22 | 38N | 17W | 0 | 15 | 9/25/87 | Private Well | RAKEY | Ozark | | 40 |
| WIMS | 0006144A | 0 | 0 | | NE | NE | 27 | 38N | 17W | 0 | 0 | 5/16/88 | Private Well | SULHAM | Ozark | | 0 |
| WIMS | 0014191A | 725 | 235 | | NW | NE | 22 | 38N | 17W | 1045 | 370 | 8/17/87 | Private Well | CONSERVATION | Ozark | | 35 |
| WIMS | 0015210A | 695 | 440 | | SE | SE | 14 | 38N | 17W | 0 | 180 | 12/21/88 | Private Well | WATKINS | Ozark | | 80 |
| WIMS | 0016656A | 467 | 166 | | NW | NE | 22 | 38N | 17W | 0 | 280 | 7/6/89 | Private Well | WEBB | Ozark | | 20 |
| WIMS | 0034711A | 260 | 105 | | NW | SE | 27 | 38N | 17W | 689 | 20 | 6/7/90 | Private Well | BOYCE | Ozark | | 25 |
| WIMS | 0034716A | 240 | 105 | | NW | SE | 27 | 38N | 17W | 669 | 8 | 5/29/90 | Private Well | FIFIELD | Ozark | | 0 |
| WIMS | 0046879A | 233 | 140 | | SW | NW | 22 | 38N | 17W | 689 | 40 | 5/20/91 | Private Well | DICKEMANN | Ozark | | 40 |
| WIMS | 0046891A | 498 | 122 | | SW | NE | 22 | 38N | 17W | 0 | 325 | 11/7/93 | Private Well | MARR | Ozark | | 18 |
| WIMS | 0052628A | 210 | 120 | | SE | SW | 22 | 38N | 17W | 0 | 35 | 5/1/92 | Private Well | SPICER | Ozark | | 30 |
| WIMS | 0052656A | 210 | 100 | | NW | NE | 34 | 38N | 17W | 0 | 35 | 8/15/92 | Private Well | SALLS | Ozark | | 20 |

## Wells located 1 to 2 Miles from the Former Hulett Lagoon

| Source | Well ID | Depth | CSG | Q1 | Q2 | Q3 | SEC | TWN | RNG | Elev | SWL | Date | Use | Owner | Aquifer | PWSSIDEXT ID# | GPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIMS | 0054516A | 407 | 168 | | NE | NW | 13 | 38N | 17W | 0 | 220 | 10/25/90 | Private Well | | Ozark | | 40 |
| WIMS | 0059221A | 215 | 106 | | | | 27 | 38N | 17W | 690 | 22 | 12/6/90 | Private Well | MONTGOMERY | Ozark | | 25 |
| WIMS | 0062723A | 380 | 102 | | NE | SW | 27 | 38N | 17W | 0 | 265 | 3/13/91 | Private Well | MCKEVER | Ozark | | 30 |
| WIMS | 0066010A | 260 | 121 | | | SW | 27 | 38N | 17W | 0 | 12 | 5/19/92 | Private Well | BAILEY | Ozark | | 30 |
| WIMS | 0091425A | 200 | 140 | NE | SE | NW | 27 | 38N | 17W | 698 | 18 | 8/26/93 | Private Well | BRIGGS | Ozark | | 20 |
| WIMS | 0096827A | 178 | 14 | SW | NE | SW | 27 | 38N | 17W | 0 | 23 | 12/16/93 | Private Well | | Ozark | | 15 |
| WIMS | 0096841A | 340 | 220 | NW | NE | NW | 27 | 38N | 17W | 787 | 125 | 2/18/94 | Private Well | BARE | Ozark | | 40 |
| WIMS | 0120553A | 520 | 250 | NW | SW | NE | 22 | 38N | 17W | 0 | 350 | 9/14/94 | Private Well | LEDBETTER | Ozark | | 25 |
| WIMS | 0120852A | 235 | 174 | | NW | SE | 22 | 38N | 17W | 0 | 80 | 6/27/94 | Private Well | HOLLINGSWORTH | Ozark | | 25 |
| WIMS | 0120868A | 293 | 110 | NE | SE | SW | 22 | 38N | 17W | 0 | 140 | 11/24/94 | Private Well | ZEY | Ozark | | 25 |
| WIMS | 0173794A | 220 | 143 | | | | 27 | 38N | 17W | 0 | 30 | 10/31/92 | Private Well | STONER | Ozark | | 35 |
| WIMS | 0186114A | 320 | 142 | | NW | SE | 27 | 38N | 17W | 0 | 20 | 9/25/97 | Private Well | NEWILL | Ozark | | 65 |
| WIMS | 0190879A | 230 | 160 | | NW | SE | 27 | 38N | 17W | 0 | 20 | 5/22/97 | Private Well | WOMACK | Ozark | | 0 |

# 2 to 3 Miles

| Source | Well ID | Depth | CSG | Q1 | Q2 | Q3 | SEC | TWN | RNG | Elev | SWL | Date | Use | Owner | Aquifer | PWSSIDEXT ID# | GPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOGMAIN | 006568 | 70 | 41 | NW | SE | SE | 16 | 38N | 17W | 671 | | 1940 | Private Well | SCOTT, L C #1 | Ozark | | 50 |
| LOGMAIN | 014093 | 570 | 250 | SE | SE | NW | 15 | 38N | 17W | 990 | 195 | 1955 | Private Well | SCOTT, L.C. #2 | Ozark | | 55 |
| LOGMAIN | 25162 | 550 | 250 | SE | NW | SE | 33 | 38N | 17W | 764 | 78 | 1967 | Transient | LAKE VALLEY COUNTRY CLUB | Ozark | | 93 |
| LOGMAIN | 26629 | 505 | 350 | S2 | N2 | NW | 32 | 38N | 16W | 1021 | 250 | 1970 | Nontransient | VIRGIL EADES TRAILER CT | Ozark | 3048141101 | 100 |
| LOGMAIN | 28620 | 860 | 528 | | | | 17 | 38N | 16W | 0 | 90 | 1983 | Community | CITY OF LINN CREEK | Ozark | 3010471102 | 225 |
| LOGMAIN | 5698 | 296 | 170 | SE | NW | NW | 17 | 38N | 16W | 696 | 15 | 1939 | Community | CITY OF LINN CREEK | Ozark | | 40 |
| PDWP | 41487 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Transient | Cedar Green Resort | Ozark | 3010130103 | 0 |
| PDWP | 41580 | 350 | 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 63 | 1978 | Transient | Adam's Ale Resort Inc | Ozark | 3191518101 | 0 |
| PDWP | 41581 | 140 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 1973 | Transient | Rippling Waters Resort | Ozark | 3191747101 | 25 |
| PDWP | 41615 | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1984 | Transient | Lake Valley Condos | Ozark | 3210248101 | 0 |
| PDWP | 42571 | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1985 | Transient | Lake Valley Condos | Ozark | 3258251101 | 0 |
| PDWP | 42572 | 340 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1986 | Transient | Lake Valley Condos | Ozark | 3238026102 | 0 |
| PDWP | 42573 | 340 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1987 | Transient | Lake Valley Condos | Ozark | 3238026103 | 0 |
| PDWP | 42611 | 150 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 1982 | Transient | Rippling Waters Resort | Ozark | 3238026104 | 25 |
| WIMS | 0000624A | 138 | 82 | | | | 28 | 38N | 17W | 0 | 50 | 6/15/87 | Private Well | RESORT | Ozark | | 25 |
| WIMS | 0001841A | 380 | 305 | | | | 32 | 38N | 16W | 0 | 225 | 7/30/87 | Private Well | BOND | Ozark | | 30 |
| WIMS | 0002012A | 260 | 84 | | | | 28 | 38N | 17W | 0 | 90 | 8/25/87 | Private Well | ULIUS | Ozark | | 20 |
| WIMS | 0002249A | 420 | 147 | | | | 31 | 38N | 16W | 0 | 215 | 8/25/87 | Private Well | MOSIER | Ozark | | 30 |
| WIMS | 0004060A | 400 | 105 | | SW | NE | 31 | 38N | 16W | 0 | 200 | 10/5/87 | Private Well | DAUGHERTY, SR. | Ozark | | 30 |
| WIMS | 0005182A | 198 | 84 | | NE | NW | 03 | 37N | 17W | 685 | 38 | | Private Well | SUTTON | Ozark | | 20 |
| WIMS | 0005246A | 195 | 105 | | SW | NE | 28 | 38N | 17W | 0 | 30 | 4/21/88 | Private Well | BRANY | Ozark | | 30 |
| WIMS | 0005557A | 300 | 126 | | | | 17 | 38N | 16W | 0 | 200 | 4/22/88 | Private Well | ENTERPRISES | Ozark | | 25 |
| WIMS | 0005948A | 217 | 88 | | SW | NE | 28 | 38N | 17W | 0 | 0 | | Private Well | | Ozark | | 30 |
| WIMS | 0005951A | 340 | 105 | | SW | NE | 34 | 38N | 17W | 0 | 145 | 11/21/87 | Private Well | SALLS | Ozark | | 30 |

Wells located 2 to 3 Miles from the Former Hulett Lagoon

| Source | Well ID | Depth | CSG | Q1 | Q2 | Q3 | SEC | TWN | RNG | Elev | SWL | Date | Use | Owner | Aquifer | PWSSIDEXT ID# | GPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIMS | 0005999A | 178 | 105 | | NW | NW | 03 | 37N | 17W | 0 | 25 | 7/25/87 | Private Well | WEBB | Ozark | | 20 |
| WIMS | 0006000A | 218 | 147 | | NW | NW | 03 | 37N | 17W | 0 | 60 | | Private Well | HANKS | Ozark | | 25 |
| WIMS | 0007295A | 380 | 126 | | SE | SE | 17 | 38N | 16W | 0 | 270 | 7/27/88 | Private Well | WILLIAMS | Ozark | | 40 |
| WIMS | 0007296A | 380 | 85 | | SW | NE | 17 | 38N | 16W | 0 | 250 | 5/22/88 | Private Well | KOWAL | Ozark | | 20 |
| WIMS | 0007306A | 530 | 210 | | SE | NE | 33 | 38N | 17W | 0 | 65 | 6/23/88 | Private Well | LAKE VALLEY | Ozark | | 75 |
| WIMS | 0007320A | 155 | 105 | | SW | NE | 12 | 38N | 17W | 0 | 20 | 8/5/88 | Private Well | WILBURN | Ozark | | 60 |
| WIMS | 0011103A | 0 | 0 | SE | NE | NW | 03 | 37N | 17W | 0 | 12 | 6/24/88 | Private Well | LUKOSIUS | Ozark | | 0 |
| WIMS | 0011741A | 0 | 84 | | SW | NE | 28 | 38N | 17W | 0 | 90 | 8/25/87 | Private Well | ULIUS | Ozark | | 20 |
| WIMS | 0012040A | 385 | 83 | | NE | SE | 01 | 37N | 17W | 0 | 200 | 9/1/88 | Private Well | JONES | Ozark | | 37 |
| WIMS | 0012651A | 178 | 105 | | NE | NE | 21 | 38N | 17W | 680 | 20 | 3/16/89 | Private Well | STAUCH | Ozark | | 20 |
| WIMS | 0014203A | 340 | 168 | | | | 16 | 38N | 17W | 0 | 210 | 8/18/87 | Private Well | THOMPSON | Ozark | | 35 |
| WIMS | 0015206A | 343 | 103 | | NE | SW | 32 | 38N | 16W | 0 | 140 | 6/15/89 | Private Well | HICK | Ozark | | 25 |
| WIMS | 0015367A | 170 | 108 | | SW | NE | 28 | 38N | 17W | 0 | 0 | 2/15/89 | Private Well | MORRIS | Ozark | | 30 |
| WIMS | 0026787A | 343 | 105 | | NE | NE | 28 | 38N | 17W | 0 | 60 | 11/14/89 | Private Well | HEAD | Ozark | | 35 |
| WIMS | 0033740A | 158 | 90 | | NW | NW | 03 | 37N | 17W | 670 | 10 | 7/25/89 | Private Well | SUTTON | Ozark | | 20 |
| WIMS | 0043289A | 100 | 0 | | NE | NW | 34 | 38N | 17W | 0 | 0 | | Private Well | LAMPERT | Ozark | | 0 |
| WIMS | 0044602A | 380 | 139 | | SW | NW | 32 | 38N | 16W | 0 | 205 | 6/18/89 | Private Well | NEELEY | Ozark | | 25 |
| WIMS | 0044623A | 200 | 126 | | NE | NE | 21 | 38N | 17W | 690 | 43 | 10/27/89 | Private Well | STAUCH | Ozark | | 20 |
| WIMS | 0044635A | 220 | 126 | | NW | NW | 03 | 37N | 17W | 670 | 62 | 11/24/89 | Private Well | PERSELS | Ozark | | 30 |
| WIMS | 0047228A | 235 | 140 | | NE | SW | 21 | 38N | 17W | 0 | 45 | 8/16/90 | Private Well | MCADAMS | Ozark | | 30 |
| WIMS | 0052590A | 250 | 175 | SW | SW | SW | 21 | 38N | 17W | 0 | 60 | 11/11/90 | Private Well | COLLINS | Ozark | | 55 |
| WIMS | 0052595A | 151 | 80 | NE | NW | SW | 34 | 38N | 17W | 680 | 10 | 12/13/90 | Private Well | FOSTER | Ozark | | 25 |
| WIMS | 0052626A | 231 | 110 | SW | SE | SW | 34 | 38N | 17W | 710 | 65 | 9/3/93 | Private Well | DICKMAN | Ozark | | 25 |
| WIMS | 0054310A | 240 | 120 | | NW | SW | 34 | 38N | 17W | 660 | 35 | 11/20/90 | Private Well | ROWE | Ozark | | 30 |
| WIMS | 0054311A | 220 | 119 | | NW | SW | 34 | 38N | 17W | 720 | 30 | 10/19/90 | Private Well | BALMER | Ozark | | 30 |
| WIMS | 0054493A | 282 | 126 | | SE | SW | 12 | 38N | 17W | 0 | 35 | 10/10/90 | Private Well | THOMASON | Ozark | | 35 |
| WIMS | 0058354A | 360 | 126 | | SE | NW | 32 | 38N | 16W | 0 | 205 | 11/30/90 | Private Well | SIMMONS | Ozark | | 20 |
| WIMS | 0062718A | 200 | 100 | NW | SE | | 20 | 38N | 16W | 0 | 12 | 3/9/91 | Private Well | BARCLAY | Ozark | | 60 |
| WIMS | 0062770A | 175 | 107 | NE | NW | SW | 27 | 38N | 17W | 689 | 22 | 7/19/91 | Private Well | STOVER | Ozark | | 30 |
| WIMS | 0064171A | 170 | 124 | | NW | SE | 10 | 38N | 17W | 0 | 30 | 6/25/91 | Private Well | OCAMPO | Ozark | | 30 |
| WIMS | 0064821A | 475 | 153 | SW | SE | SW | 34 | 38N | 17W | 730 | 78 | 11/3/94 | Private Well | LUTHER | Ozark | | 25 |
| WIMS | 0068405A | 198 | 100 | SW | NW | NE | 03 | 37N | 17W | 680 | 15 | 10/14/91 | Private Well | REAM | Ozark | | 20 |
| WIMS | 0077405A | 375 | 80 | NE | NE | NE | 15 | 38N | 17W | 940 | 240 | 2/15/93 | Private Well | BENBOW | Ozark | | 25 |
| WIMS | 0077412A | 351 | 80 | | NE | SW | 10 | 38N | 17W | 0 | 150 | 12/10/92 | Private Well | ROBINSON | Ozark | | 25 |
| WIMS | 0077420A | 370 | 80 | | SE | NE | 20 | 38N | 16W | 0 | 195 | 11/1/92 | Private Well | SHMIDT | Ozark | | 20 |
| WIMS | 0077771A | 200 | 140 | NW | SW | SE | 34 | 38N | 17W | 660 | 23 | 9/17/92 | Private Well | LOMBARDO | Ozark | | 25 |
| WIMS | 0088177A | 210 | 82 | | NE | SW | 28 | 38N | 17W | 0 | 90 | 5/13/92 | Private Well | CYROS | Ozark | | 25 |
| WIMS | 0091365A | 195 | 140 | NW | NW | SW | 27 | 38N | 17W | 689 | 42 | 5/22/93 | Private Well | SWANSON | Ozark | | 30 |
| WIMS | 0120260A | 180 | 120 | | | | 21 | 38N | 17W | 0 | 15 | | Private Well | JACKSON | Ozark | | 20 |

Wells located 2 to 3 Miles from the Former Hulett Lagoon

| Source | Well ID | Depth | CSG | Q1 | Q2 | Q3 | SEC | TWN | RNG | Elev | SWL | Date | Use | Owner | Aquifer | PWSSIDEXT ID# | GPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIMS | 0120860A | 352 | 80 | NE | SW | NW | 32 | 38N | 16W | 0 | 170 | 9/15/94 | Private Well | BURNS | Ozark | | 20 |
| WIMS | 0120864A | 375 | 100 | SE | NW | SE | 17 | 38N | 16W | 0 | 270 | 10/2/94 | Private Well | SHRAUGEN | Ozark | | 20 |
| WIMS | 0120872A | 393 | 100 | | SW | NE | 17 | 38N | 16W | 0 | 260 | 11/9/94 | Private Well | BOOKE | Ozark | | 25 |
| WIMS | 0120872A | 393 | 100 | | SW | NE | 17 | 38N | 16W | 0 | 260 | 11/9/94 | Private Well | BOOKE | Ozark | | 25 |
| WIMS | 0138061A | 310 | 80 | | SW | NE | 17 | 38N | 16W | 0 | 170 | 4/10/96 | Private Well | WITTE | Ozark | | 20 |
| WIMS | 0158044A | 340 | 102 | | SE | SW | 34 | 38N | 17W | 0 | 140 | 8/22/96 | Private Well | GOLDSTEN | Ozark | | 20 |
| WIMS | 0169782A | 300 | 97 | | | | 10 | 38N | 17W | 0 | 175 | 5/28/97 | Private Well | EBERT | Ozark | | 30 |
| WIMS | 0182558A | 340 | 100 | | NW | NW | 03 | 37N | 17W | 0 | 120 | 6/30/97 | Private Well | WILSMAN | Ozark | | 15 |

# 3 to 4 Miles

| Source | Well ID | Depth | CSG | Q1 | Q2 | Q3 | SEC | TWN | RNG | Elev | SWL | Date | Use | Owner | Aquifer | PWSSIDEXT ID# | GPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOGMAIN | 013462 | 275 | 66 | NE | NE | SE | 07 | 37N | 16W | 1065 | 225 | 1955 | Private Well | CHANDLER, MOCK | Ozark | | 5 |
| LOGMAIN | 015981 | 365 | 0 | SE | NE | SW | 16 | 38N | 16W | 979 | | 1956 | Private Well | PARKINSON, JOHN | Ozark | | 30 |
| LOGMAIN | 018777 | 140 | 28 | C | SW | NW | 09 | 38N | 16W | 790 | 20 | 1959 | Private Well | BOND, GUY O. | Ozark | | 20 |
| LOGMAIN | 27342 | 540 | 400 | NW | SW | NE | 17 | 38N | 16W | 800 | 150 | 1973 | Nontransient | ST. MORITZ | Ozark | | 75 |
| LOGMAIN | 27691 | 925 | 430 | SE | NW | NE | 02 | 38N | 17W | 886 | 230 | 1974 | Nontransient | CAMELOT ESTATES | Ozark | | |
| LOGMAIN | 28162 | 800 | 470 | C | NW | SW | 05 | 38N | 16W | 900 | | | Nontransient | CAPE OF THE WOODS | Ozark | | |
| PDWP | 41567 | 300 | 150 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 1984 | Transient | Clearwater Resort | Ozark | 3190757101 | 30 |
| PDWP | 41610 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Transient | 54 & A Truck Stop & Restaurant | Ozark | 3191748101 | 0 |
| PDWP | 41619 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Transient | Windwood Condos | Ozark | 3238026101 | 0 |
| WIMS | 0000178A | 200 | 84 | | | | 01 | 38N | 17W | 0 | 82 | 4/15/87 | Private Well | GROHE | Ozark | | 15 |
| WIMS | 0000428A | 300 | 84 | | | | 01 | 38N | 17W | 0 | 166 | 4/30/87 | Private Well | SHUMATO | Ozark | | 15 |
| WIMS | 0001307A | 138 | 103 | | | | 03 | 37N | 17W | 0 | 15 | 6/4/87 | Private Well | TALLEY | Ozark | | 20 |
| WIMS | 0002013A | 300 | 84 | | | | 16 | 38N | 16W | 0 | 0 | 8/31/87 | Private Well | HENSON | Ozark | | 20 |
| WIMS | 0002293A | 196 | 103 | | | | 29 | 38N | 17W | 0 | 30 | 7/23/87 | Private Well | KEARNS | Ozark | | 30 |
| WIMS | 0002386A | 238 | 84 | | | | 16 | 38N | 16W | 0 | 30 | 9/18/87 | Private Well | CONSTRUCTION | Ozark | | 30 |
| WIMS | 0002387A | 238 | 0 | | | | 16 | 38N | 16W | 0 | 0 | 9/18/87 | Private Well | CONSTRUCTION | Ozark | | 0 |
| WIMS | 0004178A | 363 | 105 | | NE | SW | 03 | 38N | 17W | 0 | 100 | | Private Well | CLARK | Ozark | | 0 |
| WIMS | 0005142A | 360 | 105 | | | | 09 | 38N | 17W | 0 | 160 | 2/12/88 | Private Well | COLEMAN | Ozark | | 35 |
| WIMS | 0005995A | 176 | 105 | | SW | NE | 06 | 38N | 16W | 0 | 15 | 8/10/87 | Private Well | DONOHO | Ozark | | 30 |
| WIMS | 0006398A | 0 | 0 | | | | 21 | 38N | 16W | 0 | 0 | 5/9/88 | Private Well | BAHNMILLER | Ozark | | 0 |
| WIMS | 0006809A | 360 | 0 | | NE | SW | 29 | 38N | 17W | 0 | 140 | 2/15/88 | Private Well | COLEMAN | Ozark | | 0 |
| WIMS | 0006866A | 0 | 0 | | | | 16 | 38N | 16W | 0 | 0 | 6/3/88 | Private Well | EBLING | Ozark | | 0 |
| WIMS | 0008263A | 220 | 105 | | | | 06 | 38N | 16W | 0 | 30 | 4/8/88 | Private Well | LONG | Ozark | | 10 |
| WIMS | 0008591A | 322 | 106 | | | | 09 | 37N | 17W | 0 | 25 | 9/3/88 | Private Well | COLLINS | Ozark | | 40 |
| WIMS | 0008592A | 385 | 84 | | | | 29 | 38N | 17W | 0 | 180 | 9/10/88 | Private Well | DAILEY | Ozark | | 30 |
| WIMS | 0008719A | 400 | 181 | | NW | SE | 28 | 38N | 16W | 0 | 155 | 8/25/88 | Private Well | TRUITT | Ozark | | 30 |
| WIMS | 0008724A | 477 | 87 | | SW | SW | 33 | 38N | 17W | 0 | 260 | 8/28/88 | Private Well | COY | Ozark | | 22 |
| WIMS | 0009625A | 240 | 110 | | SE | SE | 20 | 38N | 17W | 0 | 30 | 10/18/88 | Private Well | WARD | Ozark | | 18 |
| WIMS | 0009676A | 180 | 126 | | SW | NE | 03 | 38N | 17W | 0 | 30 | 8/9/88 | Private Well | DERRINGER | Ozark | | 40 |

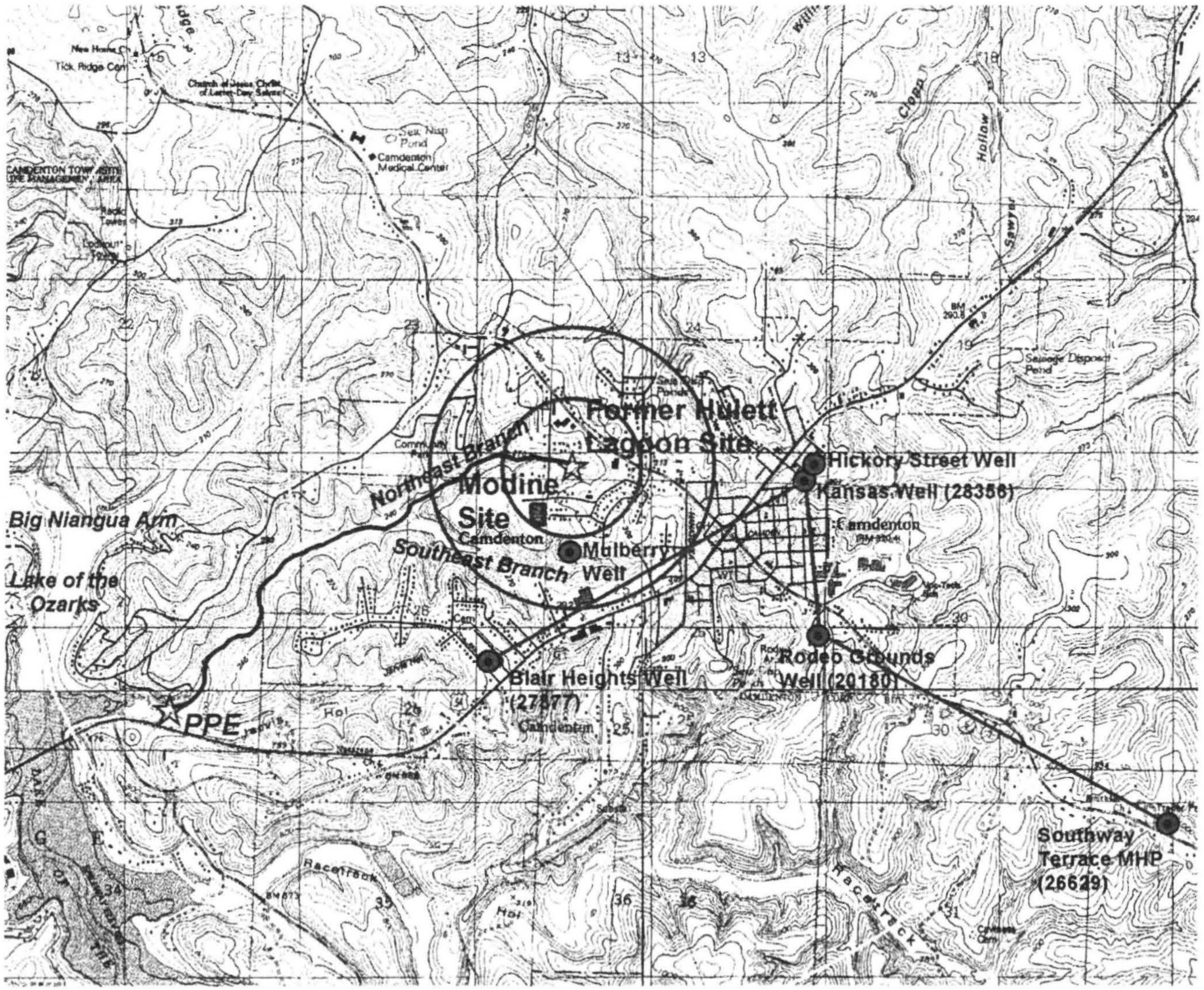
Wells located 3 to 4 Miles from the Former Hulett Lagoon

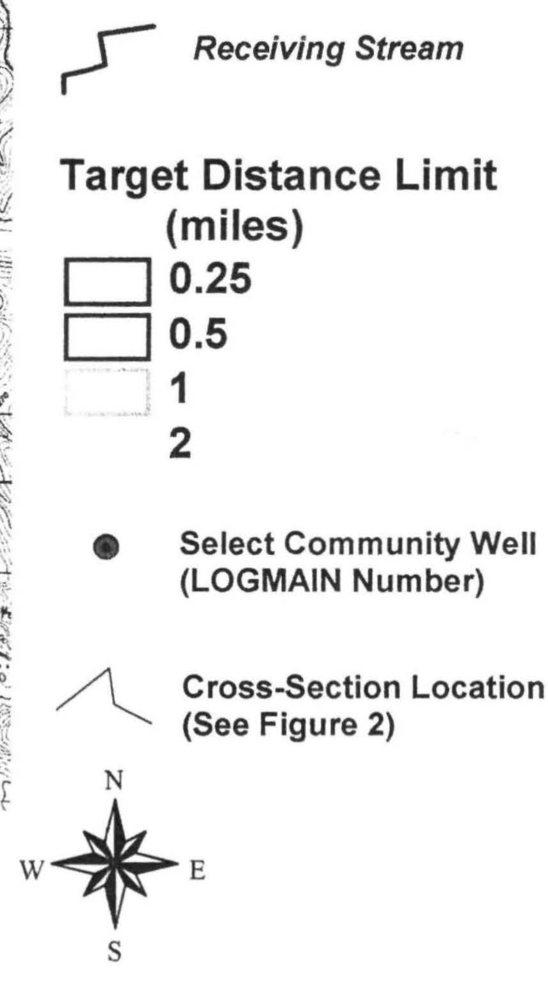
| Source | Well ID | Depth | CSG | Q1 | Q2 | Q3 | SEC | TWN | RNG | Elev | SWL | Date | Use | Owner | Aquifer | PWSSIDEXT ID# | GPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIMS | 0011489A | 400 | 106 | | SE | NW | 28 | 38N | 16W | 0 | 160 | 10/16/88 | Private Well | RAYBURN | Ozark | | 25 |
| WIMS | 0011697A | 375 | 80 | | NE | SE | 20 | 38N | 17W | 0 | 0 | 7/26/88 | Private Well | SHARP | Ozark | | 18 |
| WIMS | 0012606A | 219 | 84 | | | | 03 | 38N | 17W | 0 | 0 | 5/1/88 | Private Well | HASTINGS | Ozark | | 40 |
| WIMS | 0015212A | 651 | 405 | | SW | SW | 33 | 38N | 16W | 0 | 170 | 5/16/89 | Private Well | | Ozark | | 90 |
| WIMS | 0015364A | 200 | 92 | | NE | NE | 07 | 38N | 16W | 0 | 10 | 3/18/89 | Private Well | | Ozark | | 40 |
| WIMS | 0015368A | 210 | 87 | | NW | NE | 04 | 37N | 17W | 0 | 30 | 2/1/89 | Private Well | MORRIS | Ozark | | 12 |
| WIMS | 0019739A | 480 | 202 | | NE | NE | 01 | 38N | 17W | 0 | 140 | 12/9/96 | Private Well | FRETHOLM | Ozark | | 50 |
| WIMS | 0026793A | 198 | 190 | | SE | NW | 04 | 37N | 17W | 720 | 0 | 1/23/90 | Private Well | COLLINS | Ozark | | 60 |
| WIMS | 0035888A | 333 | 121 | | NE | SW | 28 | 38N | 16W | 0 | 210 | 6/25/91 | Private Well | ROYALS | Ozark | | 20 |
| WIMS | 0035889A | 332 | 80 | | SE | NW | 16 | 38N | 17W | 0 | 180 | 5/10/94 | Private Well | STIDHAM | Ozark | | 18 |
| WIMS | 0035905A | 297 | 86 | | SW | NE | 16 | 38N | 16W | 0 | 115 | 2/20/90 | Private Well | EVANS | Ozark | | 100 |
| WIMS | 0035914A | 353 | 128 | | NE | SW | 16 | 38N | 16W | 0 | 180 | 12/9/89 | Private Well | MABREY | Ozark | | 50 |
| WIMS | 0043866A | 400 | 103 | | SE | NW | 16 | 38N | 17W | 0 | 207 | 5/8/90 | Private Well | LUX | Ozark | | 20 |
| WIMS | 0046869A | 353 | 106 | | NE | SW | 33 | 38N | 17W | 0 | 245 | 12/26/90 | Private Well | MORRIS | Ozark | | 15 |
| WIMS | 0046884A | 190 | 80 | | NE | NW | 16 | 38N | 16W | 0 | 45 | 7/8/93 | Private Well | EVELAND | Ozark | | 12 |
| WIMS | 0046895A | 377 | 119 | | NE | NE | 05 | 37N | 16W | 0 | 205 | 10/1/93 | Private Well | GEORGE | Ozark | | 25 |
| WIMS | 0052598A | 312 | 100 | | NW | SW | 21 | 38N | 16W | 0 | 155 | 9/13/92 | Private Well | BARTLETT | Ozark | | 25 |
| WIMS | 0052601A | 210 | 140 | | NW | SE | 20 | 38N | 17W | 0 | 40 | 5/2/93 | Private Well | MCGRATH | Ozark | | 50 |
| WIMS | 0052623A | 248 | 84 | | NE | NE | 17 | 38N | 16W | 0 | 35 | 7/15/92 | Private Well | JACKSON | Ozark | | 30 |
| WIMS | 0052632A | 210 | 120 | SE | SW | SE | 20 | 38N | 17W | 665 | 45 | 7/1/92 | Private Well | WERNER | Ozark | | 30 |
| WIMS | 0052650A | 291 | 80 | | NW | SW | 33 | 38N | 17W | 0 | 140 | 8/18/92 | Private Well | RODGERS | Ozark | | 25 |
| WIMS | 0054161A | 340 | 106 | | NW | SW | 21 | 38N | 16W | 0 | 166 | 7/23/90 | Private Well | STRINE | Ozark | | 22 |
| WIMS | 0054164A | 355 | 170 | SW | SW | NE | 16 | 38N | 17W | 905 | 207 | 8/3/90 | Private Well | SHERRELL | Ozark | | 30 |
| WIMS | 0057058A | 210 | 100 | | SE | NW | 33 | 38N | 17W | 0 | 55 | 2/22/94 | Private Well | BULLOCK | Ozark | | 30 |
| WIMS | 0062753A | 200 | 100 | | | | 06 | 38N | 16W | 0 | 50 | 6/3/91 | Private Well | ALSBACH | Ozark | | 20 |
| WIMS | 0062774A | 360 | 144 | | NW | NW | 21 | 38N | 16W | 0 | 205 | 7/30/91 | Private Well | WEST | Ozark | | 30 |
| WIMS | 0066002A | 260 | 182 | | NE | NE | 04 | 37N | 17W | 0 | 90 | 3/31/92 | Private Well | ICENOGLE | Ozark | | 25 |
| WIMS | 0068399A | 200 | 100 | NW | NW | NW | 28 | 38N | 17W | 669 | 18 | 10/21/91 | Private Well | | Ozark | | 20 |
| WIMS | 0068406A | 220 | 120 | SE | SW | NE | 20 | 38N | 17W | 679 | 18 | 10/1/91 | Private Well | WHITE | Ozark | | 8 |
| WIMS | 0077419A | 360 | 80 | | SE | NW | 21 | 38N | 16W | 0 | 210 | 12/16/92 | Private Well | WEBB | Ozark | | 40 |
| WIMS | 0091289A | 250 | 103 | | NW | NE | 04 | 37N | 17W | 0 | 23 | 12/1/93 | Private Well | GRECO | Ozark | | 20 |
| WIMS | 0091290A | 170 | 103 | | NW | NE | 04 | 37N | 17W | 0 | 0 | 12/2/93 | Private Well | FRUEH | Ozark | | 30 |
| WIMS | 0091373A | 480 | 105 | SW | SE | NW | 16 | 38N | 17W | 0 | 290 | 7/14/93 | Private Well | ROBBINS | Ozark | | 20 |
| WIMS | 0096836A | 240 | 160 | SW | NW | NW | 03 | 37N | 17W | 680 | 50 | 3/26/94 | Private Well | OVERBY | Ozark | | 30 |
| WIMS | 0100968A | 460 | 167 | NE | NW | NE | 08 | 37N | 16W | 0 | 196 | 3/18/94 | Private Well | ADAMS | Ozark | | 15 |
| WIMS | 0108332A | 280 | 100 | SW | SW | SE | 03 | 37N | 17W | 0 | 102 | 12/30/94 | Private Well | MIELKE | Ozark | | 20 |
| WIMS | 0108341A | 260 | 160 | SW | SW | NW | 21 | 38N | 17W | 722 | 30 | 2/13/95 | Private Well | FEUSER | Ozark | | 18 |
| WIMS | 0120261A | 320 | 82 | | | SE | 29 | 38N | 17W | 0 | 160 | 5/11/94 | Private Well | TURRICK | Ozark | | 25 |
| WIMS | 0120853A | 273 | 84 | SW | SW | NE | 03 | 38N | 17W | 0 | 127 | 7/29/94 | Private Well | ROOFENER | Ozark | | 35 |

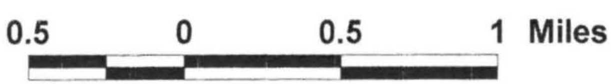
Wells located 3 to 4 Miles from the Former Hulett Lagoon

| Source | Well ID | Depth | CSG | Q1 | Q2 | Q3 | SEC | TWN | RNG | Elev | SWL | Date | Use | Owner | Aquifer | PWSSIDEXT ID# | GPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIMS | 0120873A | 170 | 110 | SW | NW | NE | 29 | 38N | 17W | 0 | 25 | 8/15/94 | Private Well | WERNER | Ozark | | 20 |
| WIMS | 0138031A | 351 | 100 | SW | SW | NW | 21 | 38N | 16W | 0 | 155 | 9/1/95 | Private Well | STAMPER | Ozark | | 25 |
| WIMS | 0138062A | 333 | 108 | | NW | SE | 28 | 38N | 16W | 0 | 0 | 12/4/95 | Private Well | LOCK | Ozark | | 25 |
| WIMS | 0138068A | 230 | 80 | | SE | NW | 16 | 38N | 16W | 0 | 70 | 3/15/96 | Private Well | HARGROVE | Ozark | | 35 |
| WIMS | 0138069A | 371 | 105 | | NW | SW | 21 | 38N | 16W | 0 | 170 | 3/20/96 | Private Well | SAMULSON | Ozark | | 25 |
| WIMS | 0138081A | 310 | 80 | | NW | SE | 28 | 38N | 16W | 0 | 145 | 10/22/96 | Private Well | STAMPER | Ozark | | 20 |
| WIMS | 0138085A | 310 | 80 | | SW | NE | 16 | 38N | 16W | 0 | 125 | 4/10/97 | Private Well | WILLIAMS | Ozark | | 25 |
| WIMS | 0141774A | 395 | 100 | NE | SW | NE | 21 | 38N | 16W | 0 | 210 | 7/6/95 | Private Well | LAKE WOOD CONS | Ozark | | 40 |
| WIMS | 0148329A | 415 | 100 | | | | 28 | 38N | 16W | 0 | 150 | 6/28/96 | Private Well | DEVIS | Ozark | | 50 |
| WIMS | 0148588A | 320 | 104 | NW | SE | NW | 21 | 38N | 16W | 0 | 110 | 12/15/95 | Private Well | LATHROP | Ozark | | 40 |
| WIMS | 0154616A | 300 | 120 | NW | SE | NE | 17 | 38N | 16W | 0 | 158 | 8/19/96 | Private Well | OSTER | Ozark | | 25 |
| WIMS | 0157304A | 375 | 82 | | | SW | 16 | 38N | 16W | 0 | 233 | 7/15/96 | Private Well | KIMMBLE | Ozark | | 32 |
| WIMS | 0157305A | 355 | 82 | | | SW | 16 | 38N | 16W | 0 | 188 | 7/15/96 | Private Well | | Ozark | | 24 |
| WIMS | 0157532A | 460 | 100 | | | NW | 11 | 37N | 17W | 0 | 240 | 10/8/96 | Private Well | NOBLE | Ozark | | 20 |
| WIMS | 0157785A | 150 | 120 | | | | 20 | 38N | 17W | 670 | 7 | 11/23/96 | Private Well | BELL | Ozark | | 30 |
| WIMS | 0173793A | 430 | 142 | | | | 07 | 37N | 16W | 0 | 260 | 6/30/96 | Private Well | ROTHOVE | Ozark | | 50 |
| WIMS | 0181020A | 360 | 82 | NE | SE | NW | 03 | 38N | 17W | 258 | 220 | 7/7/97 | Private Well | BARE | Ozark | | 15 |
| WIMS | 0185537A | 300 | 180 | | | | 08 | 38N | 17W | 0 | 90 | 9/8/97 | Private Well | WRIGHT | Ozark | | 30 |
| WIMS | 0190450A | 415 | 100 | | NW | NE | 08 | 38N | 16W | 0 | 200 | 9/30/97 | Private Well | WILLIAMS | Ozark | | 30 |

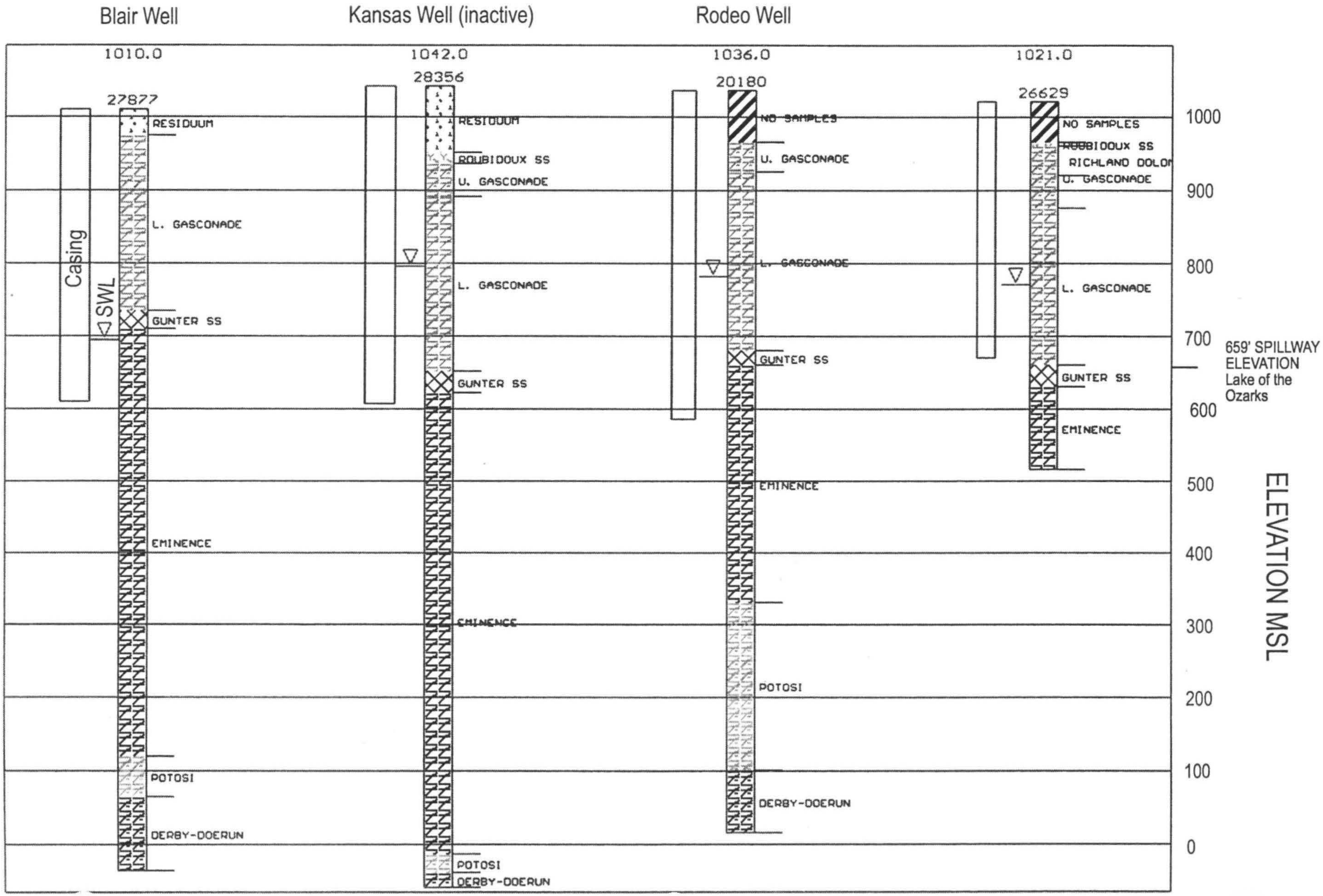
# Former Hulett Lagoon PA/SI
# Camdenton, Missouri Camden County
# Figure 1: Surface Water Pathway



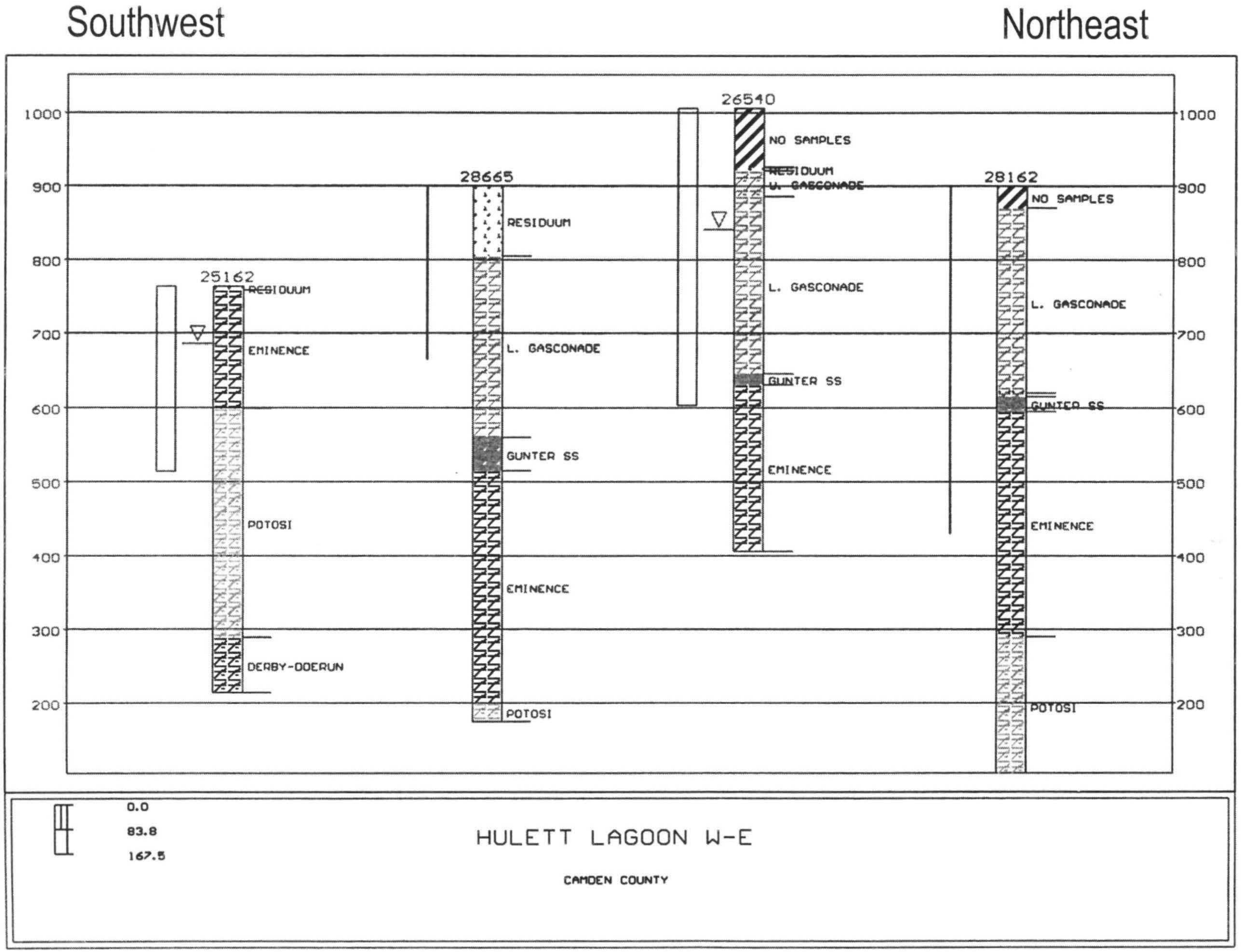



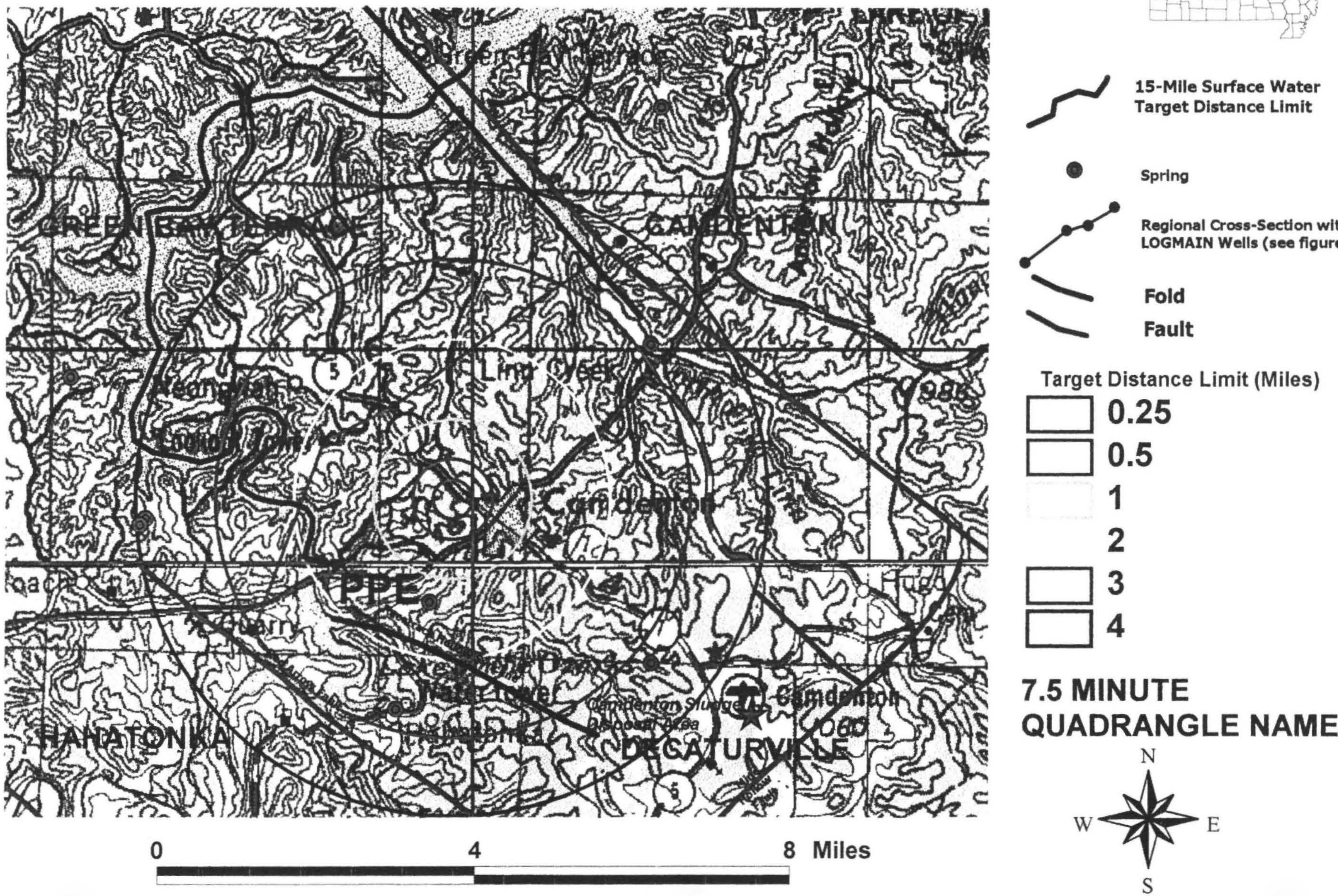
Former Hulett Lagoon PA/SI, Camdenton Missouri
Figure 2: Cross-Section (see figure 1 for well locations)



Former Hulett Lagoon PA/SI, Camdenton Missouri
Figure 3 (see figure 4 for well locations)



# Former Hulett Lagoon PA/SI
# Camden County
# Figure 4: 15-Mile Surface Water Target Distance Limit

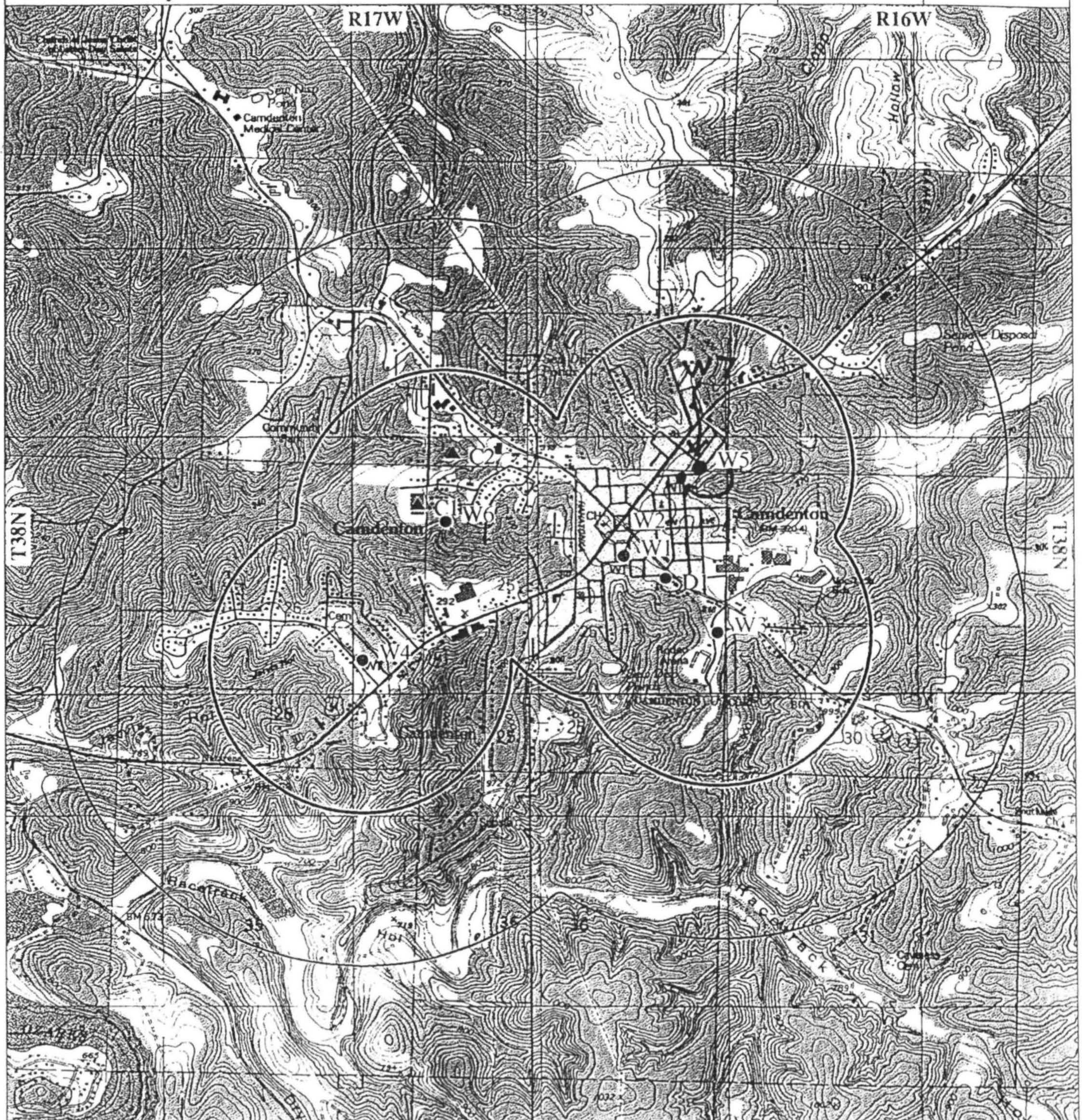


Former Hulett Lagoon Site
Combined PA/SI
Reference 44

# Camdenton
# 3010130
# 6 wells, 2 chemical sites, 1 dealership
Camden County

This map is s[ubject]
to change as a[dditional]
information is [available]
Production Da[te]
November 05, 1998

2-24-99




Prepared by

CARES
University of Missouri – Columbia

- ● Wellhead
- ▲ Chemical Site
- ● Dealership
- ◆ Tank or WTP
- Half Mile Buffer
- One Mile Buffer

Chemical Area Site

Dealership Area Site

For base map symbols see the U.S. Geological Survey publication 'Topographic Map Symbols'

N

0 5000
feet

Missouri Department of Natural Resources

Division of Environmental Quality
Public Drinking Water Program

# Camdenton
# 3010130
# 6 wells

*Temporary DGLS well number. The correct well number is requested.

The information below represents the data currently associated with the water supply layers. The well/intake number corresponds to the well/intake numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired.
Source: Missouri Department of Natural Resources, Public Drinking Water Program.
Production Date: November 05, 1998

| Well Number | W1 | W2 | W3 | W4 | W5 |
|---|---|---|---|---|---|
| Extended PWS # | 3010130101 | 3010130102 | 3010130103 | 3010130104 | 3010130105 |
| Local Well Name | City Hall | City Hall | Rodeo Grounds | Blair Hgts. | Kansas |
| DGLS Well # | 46039* | 46040* | 20180 | 27877 | 28356 |
| Facility Type | City | City | City | City | City |
| Status | Abandoned | Abandoned | Active | Active | Inactive |
| Latitude | 38 0 23.78 N | 38 0 23.69 N | 38 0 10.49 N | 38 0 5.85 N | 38 0 38.87 N |
| Longitude | 92 44 39.29 W | 92 44 39.41 W | 92 44 18.82 W | 92 45 36.61 W | 92 44 22.34 W |
| USGS 7.5 Quadrangle | Camdenton | Camdenton | Camdenton | Green Bay Terrace | Camdenton |
| County | Camden | Camden | Camden | Camden | Camden |
| DNR Region | Jefferson City | Jefferson City | Jefferson City | Jefferson City | Jefferson City |
| Date Drilled (year) | 1935 | 1940 | 1961 | 1974 | 1980 |
| Material (C/U) | Consolidated | Consolidated | Consolidated | Consolidated | Consolidated |
| Yielding Strata | Potosi | Potosi | Potosi Dolomite | Potosi Dolomite | |
| Total Depth (feet) | 794.0 | 800.0 | 940.0 | 1060.0 | 1100.0 |
| Ground Elevation (ft) | 1031.0 | 1031.0 | | | |
| Top Seal | Yes | | | Satisfactory | Pressure Grout |
| Bottom Seal | Yes | | | Satisfactory | Pressure Grout |
| Casing Depth (feet) | 80.0 | 75.0 | 450.0 | 400.0 | 435.0 |
| Casing Size (inches) | 12.0 | 6.0 | 8.0 | 10.0 | 10.0 |
| Casing Type | Steel | Steel | Steel | Steel | Steel |
| Elev. of Casing Top (ft) | | | | | |
| Outer Casing Depth (ft) | | | | 46.0 | 20.0 |
| Outer Casing Size (in) | | | | 16.0 | 16.0 |
| Screen Length (feet) | | | | | |
| Screen Size (inches) | | | | | |
| Static Water Level (ft) | 95.0 | 95.0 | 254.0 | 315.0 | 232.0 |
| Well Yield (gpm) | 100 | | 380 | 100 | |
| Head (feet) | | | 50.0 | 100.0 | |
| Draw Down (feet) | | | 375.0 | 395.0 | |
| Pump Test Date (year) | | | 1984 | 1990 | |
| Pump Type | Vertical Turbine | Vertical Turbine | Vertical Turbine | Vertical Turbine | |
| Pump Manufacturer | Worthington | Fairbanks Morse | Layne | Aurora | |
| Pump Depth (feet) | | | 420 | 450 | |
| Pump Capacity (gpm) | 100 | 100 | 380 | 100 | |
| Pump Meter (Y/N) | | Y | Y | Y | |
| Standby Power (Y/N) | | | N | N | |
| VOC Detections (Y/N) | | | N | N | |
| Nitrate Detection (Y/N) | | | N | N | |
| Chlorination (Y/N) | | | N | N | |
| Filtration (Y/N) | | | N | N | |
| GWUDISW (Y/N) | | | | | |
| State Approved (Y/N) | | | | | |
| Surface Drainage | Satisfactory | Satisfactory | | Satisfactory | |
| Date Abandoned (year) | 1989 | 1989 | | | |
| Date Plugged (year) | | | | | |
| Location Method | Map Interpolation | Map Interpolation | | | Map Interpolation |
| Method Accuracy (feet) | 1300 | 1300 | | | 100 |

# Camdenton
# 3010130
# 6 wells

*Temporary DGLS well number. The correct well number is requested.

The information below represents the data currently associated with the water supply layers. The well/intake number corresponds to the well/intake numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired.
Source: Missouri Department of Natural Resources, Public Drinking Water Program
Production Date November 05, 1998 2-2

| | | |
|---|---|---|
| Well Number | W6 | W7 |
| Extended PWS # | 3010130106 | |
| Local Well Name | Mulberry Lane | Hickory |
| DGLS Well # | 40376* | |
| Facility Type | City | |
| Status | Active | Active |
| Latitude | 38 0 29.63 N | |
| Longitude | 92 45 17.85 W | |
| USGS 7.5 Quadrangle | Green Bay Terrace | |
| County | Camden | |
| DNR Region | Jefferson City | |
| Date Drilled (year) | 1986 | 1998 |
| Material (C/U) | Consolidated | |
| Yielding Strata | Potosi Dolomite | |
| Total Depth (feet) | 900.0 | 1100 |
| Ground Elevation (ft) | | |
| Top Seal | Pressure Grout | pressure grout |
| Bottom Seal | Pressure Grout | pressure grout |
| Casing Depth (feet) | 400.0 | 450 |
| Casing Size (inches) | 12.0 | 8 |
| Casing Type | Steel | steel |
| Elev. of Casing Top (ft) | | |
| Outer Casing Depth (ft) | 48.0 | |
| Outer Casing Size (in) | 16.0 | |
| Screen Length (feet) | | |
| Screen Size (inches) | | |
| Static Water Level (ft) | 95.0 | |
| Well Yield (gpm) | 600 | |
| Head (feet) | 85.0 | 135 |
| Draw Down (feet) | 265.0 | |
| Pump Test Date (year) | 1994 | |
| Pump Type | Vertical Turbine | submersible |
| Pump Manufacturer | Fairbanks Morse | |
| Pump Depth (feet) | 350 | 500 |
| Pump Capacity (gpm) | 100 | 500 |
| Pump Meter (Y/N) | Y | |
| Standby Power (Y/N) | N | |
| VOC Detections (Y/N) | Y | |
| Nitrate Detection (Y/N) | N | |
| Chlorination (Y/N) | N | |
| Filtration (Y/N) | N | |
| GWUDISW (Y/N) | | |
| State Approved (Y/N) | | |
| Surface Drainage | Satisfactory | |
| Date Abandoned (year) | | |
| Date Plugged (year) | | |
| Location Method | | map interpolation |
| Method Accuracy (feet) | | 100 |

# Camdenton
# 3010130
# 2 chemical sites

The information below represents the data currently associated with the water supply layers. The chemical site number corresponds to the chemical site numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired. Source Missouri Department of Natural Resources, Public Drinking Water Program. Production Date: November 05, 1998

| | | |
|---|---|---|
| Chemical Site # | C1 | C2 |
| Site ID # | 30035 | 30036 |
| Latitude | 38 0 32.69 N | 38 0 41.53 N |
| Longitude | 92 45 24.18 W | 92 45 16.23 W |
| Name | Modine Heat Transfer, Inc. | Hulett Lagoon |
| Address | | |
| City | Camdenton | Camdenton |
| ZIP Code | | |
| Location Method | Map Interpolation | Map Interpolation |
| Method Accuracy (feet) | 40 | 40 |
| Chemical, Db | Trichloroethylene (TCE), Db 999<br>Cyanides, Db 999<br>Multiple Metals, Db 999<br>Multiple VOCs, Db 999 | Cyanides, Db 999<br>Multiple Metals, Db 999<br>Multiple VOCs, Db 999 |

# Camdenton
# 3010130
# 1 dealership

The information below represents the data currently associated with the water supply layers The dealership number corresponds to the dealership numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired Source Missouri Department of Natural Resources, Public Drinking Water Program Production Date November 05, 1998

| | |
|---|---|
| Dealership # | D1 |
| Site ID # | 20187 |
| Latitude | 38 0 19.8 N |
| Longitude | 92 44 30.2 W |
| Name | Camdenton Farm & Garden |
| Address | Hwy 5 S |
| City | Camdenton |
| ZIP Code | 65020 |
| Database # | 48 |
| Location Method | |
| Method Accuracy (feet) | |
| Active | No |

SUPPLY CAMPENTON

WELL DATA:

| | Well No. 1 (Abandoned) | Well No. 2 (Abandoned) | Well No. 3 | Well No. 4 | Well No. 5 (No Pump) | Well No. 6 |
|---|---|---|---|---|---|---|
| Date Drilled | 1931 | 1931 | 1961 | 1974 | 1980 | 1986 |
| Local Designation | CITY HALL | CITY HALL | Rodeo Grounds | Blair Hgts | Kansas St | Mulberry |
| Type | DRILLED | DRILLED | DRILLED | Drilled | Drilled | Drilled |
| Total Depth | 800' | 794' | 940' | 1045' | 1100 <1000'? | 900' |
| Depth and Size of Casing | 79'-6" | 80'-8" | 450'-8" | 400' of 10" | 435' of 10" | 400' of 12" |
| Casing Material | STEEL | STEEL | STEEL | Steel | Steel | Steel |
| Size Hole Below Casing Point | 6" | 8" | 8" | 10" | 10" | 12" |
| Static Water Level | 95' | 95' | 254' | 315' | | |
| Draw Down and Yield | -170GPM | -170GPM | -325GPM | (new) 2.6 gpm/ft. | | |
| Water-Bearing Strata | POTOSI | POTOSI | ROUBIDOUX | | | |
| Top Seal (Method) | SPLIT RING SAN WELL SEAL | SPLIT RING SAN. WELL SEAL | PUMP MOTOR BASE | Pump Motor Base | | |
| Bottom Seal | | PRESSURE GROUT | PRESSURE GROUT 8/25/61 | 10-24-74 Press. Grout | 3-19-80 Pres. Grout | 6-24-86 Pres Grout |
| Pump Type | SUBMERSIBLE | SUBMERSIBLE | water lub VERT. TURBINE | Vert. Turbine | | Vert. Turb water lub. |
| Manufacturer | REDA | REDA | LAYNE | Aurora | | Fairbanks Morse |
| Capacity | 170+ GPM | 170+ GPM | ~~400~~ 320+ GPM | 300 GPM | | 575 100 HP |
| Pump Setting | 350' | 400' | 420' | | | |
| Meter | YES | YES | YES | Yes | | yes |
| Size and Length of Screen | — | — | — | — | | |
| Type of Standby Power | | | | | | |
| Surface Drainage | OK | O.K. | O.K. | OK. | | |
| Date Abandoned | No Pump 9/87 | No Pump 9/87 | | | No Pump 9/87 | |
| Date Plugged | | | | | | |

ELEVATION

LOCATION

E 2.03 - Rev.

FEBRUARY 24, 1999

VALERIE H. WILDER
DEPARTMENT OF NATURAL RESOURCES
P.O. BOX 176
JEFFERSON CITY MO 65102-0176

DEAR VALERIE:

THE MULBERRY WELL WAS TAKEN OFF LINE ON FEBRUARY 2, 1999 IN THE CITY OF CAMDENTON
I HAVE PUMPED THE MULBERRY WELL TO WASTE ON THE 22, 26 AND 29 OF JANUARY 1999 FOR A TOTAL OF 5 HRS

ON FEBRUARY 2, 1999 BLAIR WELL HAD ELECTRICAL PROBLEMS AND I HAD TO PUT MULBERRY BACK ON LINE. I SHUT MULBERRY OFF FEBRUARY 9, 1999 AND TOOK MULBERRY WELL OFF LINE. I PUMPED A TOTAL OF 400,000 GALS IN THAT TIME.

I DID NOT PUMP MULBERRY WELL AGAIN UNTIL FEBRUARY 12, 1999 WHEN I HAD TO PUT THE WELL BACK ON LINE WHEN WE HAD

(2)

PROBLEMS WITH OUR WATER CONTROLS AND REPAIRS WERE MADE BY R. E. PEDROTTI CO. I USED THE WELL FOR FOUR DAYS AND PUMPED 1,314 GALS INTO THE SYSTEM. MULBERRY WAS TAKEN OUT OF LINE ON FEBRUARY 16, 1999. I HAVE NOT PUMPED MULBERRY INTO THE SYSTEM TO DATE.

I HAVE PUMPED MULBERRY TO WASTE ON FEBRUARY 23, 1999 FOR ONE HOUR. AND HAVE NOT PUMPED THE WELL SENSE

IF YOU HAVE ANY QUESTIONS CONCERNING MULBERRY WELL PUMPAGE OR OTHER QUESTIONS PLEASE CONTACT ME AT (573) 346-7293

SINCERELY,

VINCENT COSTA
DIRECTOR PUBLIC WORKS

VALERIE

MULBERRY PUMPS 570 TO 600 G.P.M
MULBERRY WAS OUR LEAD WELL UNTIL JULY OF 1998. WHEN WE HAD OUR NEW CONTROLS PUT IN THIS JULY WE WERE ABLE TO SET OUR WELLS AS TOO THE TIME THEY WERE TO COME ON. I PUT MULBERRY AS THE THIRD WELL. WHEN WE HAD OUR OLD CONTROLS MULBERRY ALWAYS WAS THE FIRST WELL TO RUN. BLAIR WELL & RODEO WELL RAN WHEN MULBERRY WAS NOT ABLE TO HANDLE THE DEMAND. WE AVERAGE ABOUT 600,000 PER DAY. MULBERRY WITH THE OLD CONTROLS PUMPED ABOUT 70 % ~~THE~~ THE WATER

WITH THE NEW CONTROLS I WAS ABLE TO CUT MULBERRY DOWN TO ABOUT 40 % OF THE WATER USAGE.

I HOPE THAT THIS WILL HELP YOU

# INVENTORY OF MISSOURI PUBLIC WATER SYSTEMS 1998

RECEIVED
MAR 0 5 [illegible]
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Missouri Department of Natural Resources
Division of Environmental Quality

Former Hulett Lagoon Site
Combined PA/SI
Reference 46

# TABLE OF CONTENTS

# CITY WATER SYSTEMS

| COMMUNITY WATER SYSTEM NAME | | YEAR BEGAN | OPER LVL | OWN | POP SERV | SERV CON | PCT SUR | PCT GRD | PCT PUR SUR | PCT PUR GRD | SUPPLY CAPACITY M.G.D. | AVG DLY CONSUMP M.G.D. | FINISHED WATER STORAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CALIFORNIA** ID NUMBER MO3010124 | COUNTY LOCATION MONITEAU | 1992 | D | 4 | 3,400 | 1,711 | 0 | 100 | 0 | 0 | 2.8000 | 1.1100 | 0.2250 |
| **CALLAO** ID NUMBER MO2010125 | COUNTY LOCATION MACON | 1960 | E | 4 | 332 | 179 | 0 | 0 | 100 | 0 | 0.0432 | 0.0240 | 0.0500 |
| **CAMDENTON** ID NUMBER MO3010130 | COUNTY LOCATION CAMDEN | 1931 | E | 4 | 3,010 | 1,260 | 0 | 100 | 0 | 0 | 1.2000 | 0.5000 | 0.4250 |
| **CAMERON** ID NUMBER MO1010131 | COUNTY LOCATION CLINTON | 1919 | B | 4 | 8,300 | 1,900 | 100 | 0 | 0 | 0 | 3.1680 | 1.1500 | 1.9600 |
| **CAMPBELL** ID NUMBER MO4010132 | COUNTY LOCATION DUNKLIN | 1911 | E | 4 | 2,350 | 1,216 | 0 | 100 | 0 | 0 | 1.1520 | 0.3260 | 0.3500 |
| **CANTON** ID NUMBER MO2010134 | COUNTY LOCATION LEWIS | 1937 | B | 4 | 2,623 | 860 | 0 | 100 | 0 | 0 | 0.7200 | 0.2091 | 0.3630 |
| **CAPE GIRARDEAU** ID NUMBER MO4010136 | COUNTY LOCATION CAPE GIRARDEAU | 1931 | A | 4 | 39,500 | 13,236 | 76 | 24 | 0 | 0 | 4.7400 | 3.6000 | 5.2550 |
| **CARDWELL** ID NUMBER MO4010137 | COUNTY LOCATION DUNKLIN | 1951 | E | 4 | 792 | 398 | 0 | 100 | 0 | 0 | 0.4320 | 0.1210 | 0.0750 |
| **CARL JUNCTION** ID NUMBER MO5010138 | COUNTY LOCATION JASPER | 1910 | D | 4 | 3,875 | 1,550 | 0 | 100 | 0 | 0 | 1.8640 | 0.3500 | 0.3000 |
| **CARROLLTON** ID NUMBER MO2010140 | COUNTY LOCATION CARROLL | 1941 | A | 4 | 4,406 | 2,117 | 0 | 100 | 0 | 0 | 2.4000 | 0.6750 | 0.8400 |
| **CARTERVILLE** ID NUMBER MO5010141 | COUNTY LOCATION JASPER | 1910 | E | 4 | 1,972 | 754 | 0 | 100 | 0 | 0 | 0.0000 | 0.1260 | 0.0000 |
| **CARTHAGE** ID NUMBER MO5010142 | COUNTY LOCATION JASPER | 1909 | B | 4 | 10,747 | 4,700 | 0 | 100 | 0 | 0 | 4.0000 | 2.8000 | 2.3900 |

# CITY WATER SYSTEMS

| COMMUNITY WATER SYSTEM NAME | | YEAR BEGAN | OPER LVL | OWN | POP SERV | SERV CON | PCT SUR | PCT GRD | PCT PUR SUR | PCT PUR GRD | SUPPLY CAPACITY M.G.D. | AVG DLY CONSUMP M.G.D. | FINISHED WATER STORAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LEWISTOWN** ID NUMBER MO2010463 | COUNTY LOCATION LEWIS | 1966 | C | 4 | 502 | 294 | 100 | 0 | 0 | 0 | 0.1580 | 0.0502 | 0.0711 |
| **LEXINGTON** ID NUMBER MO1010464 | COUNTY LOCATION LAFAYETTE | 1884 | B | 2 | 5,200 | 2,278 | 100 | 0 | 0 | 0 | 1.2000 | 0.4640 | 0.2500 |
| **LIBERAL** ID NUMBER MO5010465 | COUNTY LOCATION BARTON | 1937 | D | 4 | 867 | 347 | 0 | 100 | 0 | 0 | 0.6980 | 0.0700 | 0.0550 |
| **LIBERTY** ID NUMBER MO1010466 | COUNTY LOCATION CLAY | 1962 | A | 4 | 28,000 | 7,800 | 0 | 100 | 0 | 0 | 9.0000 | 2.8500 | 5.0000 |
| **LICKING** ID NUMBER MO4010467 | COUNTY LOCATION TEXAS | 1988 | E | 4 | 1,328 | 630 | 0 | 100 | 0 | 0 | 0.5330 | 0.1676 | 0.2500 |
| **LILBOURN** ID NUMBER MO4010468 | COUNTY LOCATION NEW MADRID | 1946 | D | 4 | 1,500 | 600 | 0 | 100 | 0 | 0 | 0.6690 | 0.1685 | 0.1000 |
| **LINCOLN** ID NUMBER MO3010469 | COUNTY LOCATION BENTON | 1950 | D | 4 | 860 | 450 | 0 | 100 | 0 | 0 | 0.5400 | 0.0900 | 0.0500 |
| **LINN** ID NUMBER MO3010470 | COUNTY LOCATION OSAGE | 1937 | E | 4 | 1,220 | 605 | 0 | 100 | 0 | 0 | 0.9300 | 0.1250 | 0.3000 |
| **LINN CREEK** ID NUMBER MO3010471 | COUNTY LOCATION CAMDEN | 1939 | E | 4 | 260 | 80 | 0 | 100 | 0 | 0 | 0.0700 | 0.0350 | 0.0300 |
| **LINNEUS** ID NUMBER MO2010472 | COUNTY LOCATION LINN | 1957 | C | 4 | 529 | 222 | 100 | 0 | 0 | 0 | 0.2160 | 0.0440 | 0.0640 |
| **LOCKWOOD** ID NUMBER MO5010475 | COUNTY LOCATION DADE | 1928 | D | 4 | 1,450 | 580 | 0 | 100 | 0 | 0 | 1.0800 | 0.1900 | 0.3500 |
| **LOUISBURG** ID NUMBER MO5011068 | COUNTY LOCATION DALLAS | 1991 | D | 4 | 157 | 63 | 0 | 100 | 0 | 0 | 0.4240 | 0.0150 | 0.0100 |

# SUBDIVISION, MOBILE HOME PARK, INSTITUTION, MISCELLANEOUS WATER SYSTEMS

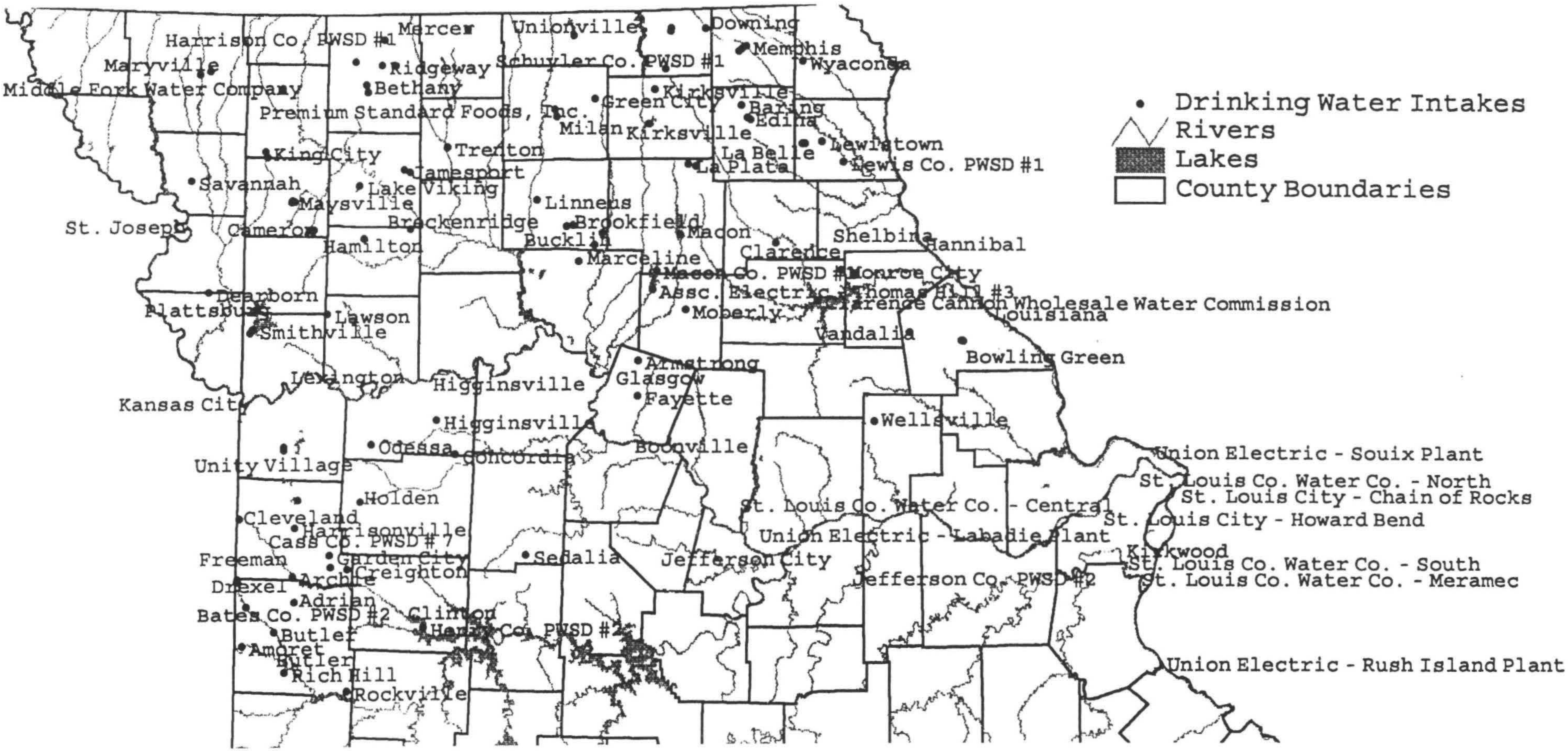
| COMMUNITY WATER SYSTEM NAME | YEAR BEGAN | OPER LVL | OWN | POP SERV | SERV CON | PCT SUR | PCT GRD | PCT PUR SUR | PCT PUR GRD | SUPPLY CAPACITY M.G.D. | AVG DLY CONSUMP M.G.D. | FINISHED WATER STORAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SOUTHERN HILLS ESTATES SUBD**<br>ID NUMBER MO5036259<br>COUNTY LOCATION NEWTON | 1989 | D | 2 | 59 | 16 | 0 | 100 | 0 | 0 | 0.1970 | 0.0044 | 0.0005 |
| **SOUTHERN HILLS WATER CO**<br>ID NUMBER MO3036065<br>COUNTY LOCATION PETTIS | 1986 | D | 2 | 190 | 52 | 0 | 100 | 0 | 0 | 0.0700 | 0.0160 | 0.0020 |
| **SOUTHFORK MHP**<br>ID NUMBER MO1048442<br>COUNTY LOCATION CASS | 1991 | C | 2 | 800 | 480 | 0 | 0 | 100 | 0 | 0.0000 | 0.0000 | 0.0000 |
| **SOUTHGATE SUBDIVISION**<br>ID NUMBER MO3036179<br>COUNTY LOCATION PETTIS | 1992 | X | 2 | 200 | 63 | 0 | 100 | 0 | 0 | 0.0600 | 0.0200 | 0.0080 |
| **SOUTHSIDE MHP LLC**<br>ID NUMBER MO3048015<br>COUNTY LOCATION BOONE | 1987 | E | 2 | 80 | 35 | 0 | 100 | 0 | 0 | 0.1250 | 0.0080 | 0.0002 |
| **SOUTHWAY TERRACE MHP**<br>ID NUMBER MO3048141<br>COUNTY LOCATION CAMDEN | 1970 | X | 2 | 85 | 35 | 0 | 100 | 0 | 0 | 0.0000 | 0.0070 | 0.0020 |
| **SOUTHWOOD ACRES SUBD**<br>ID NUMBER MO3036066<br>COUNTY LOCATION PETTIS | 1967 | X | 2 | 75 | 20 | 0 | 100 | 0 | 0 | 0.0450 | 0.0070 | 0.0640 |
| **SPARTA MHP**<br>ID NUMBER MO5048154<br>COUNTY LOCATION CHRISTIAN | 1971 | X | 2 | 75 | 30 | 0 | 100 | 0 | 0 | 0.0432 | 0.0050 | 0.0004 |
| **SPOKANE HIGHLANDS**<br>ID NUMBER MO5031093<br>COUNTY LOCATION CHRISTIAN | 1994 | E | 2 | 25 | 1 | 0 | 100 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 |
| **SPRING CREEK 2ND ADD**<br>ID NUMBER MO5030391<br>COUNTY LOCATION TANEY | 1992 | D | 2 | 35 | 15 | 0 | 100 | 0 | 0 | 0.0000 | 0.0000 | 0.0004 |
| **SPRING CREEK ADDITION MHP**<br>ID NUMBER MO5048221<br>COUNTY LOCATION TANEY | 1983 | X | 2 | 62 | 25 | 0 | 100 | 0 | 0 | 0.0000 | 0.0030 | 0.0006 |

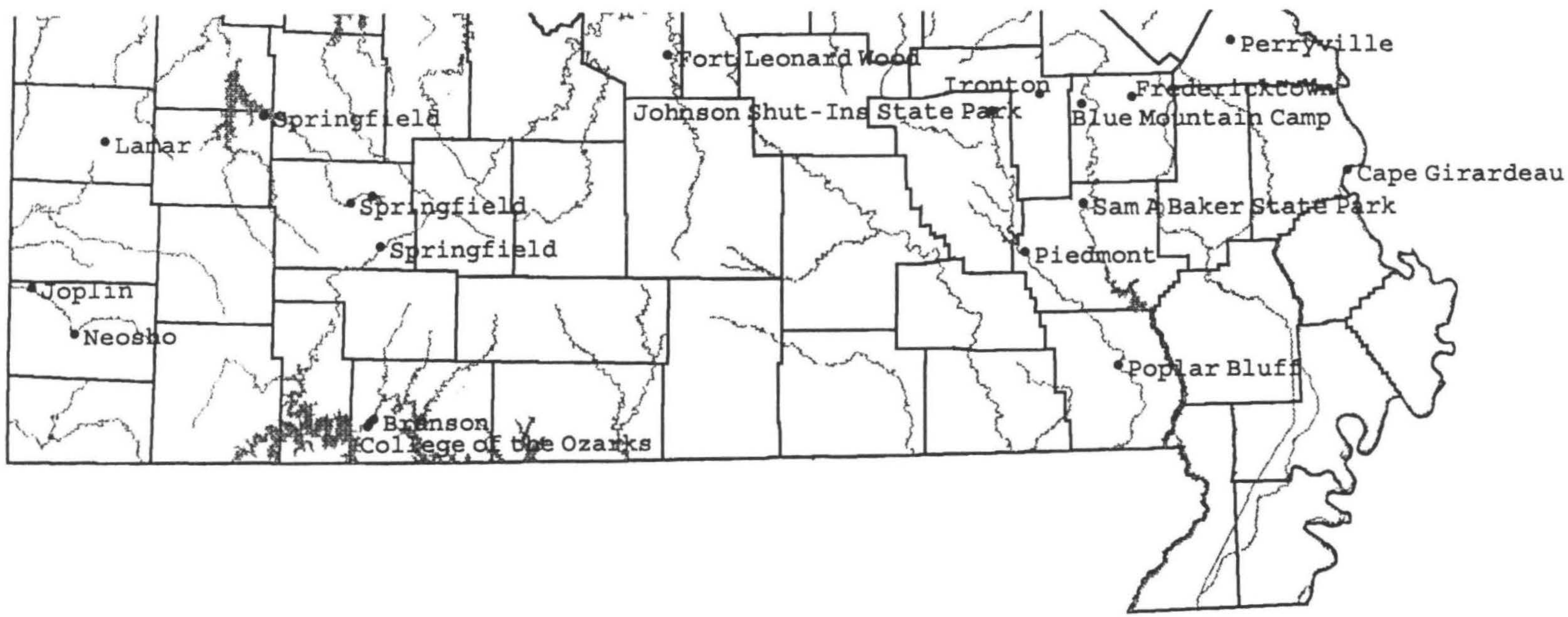
# SUBDIVISION, MOBILE HOME PARK, INSTITUTION, MISCELLANEOUS WATER SYSTEMS

| COMMUNITY WATER SYSTEM NAME | YEAR BEGAN | OPER LVL | OWN | POP SERV | SERV CON | PCT SUR | PCT GRD | PCT PUR SUR | PCT PUR GRD | SUPPLY CAPACITY M.G.D. | AVG DLY CONSUMP M.G.D. | FINISHED WATER STORAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WHITSON SCENIC VIEW MHP**<br>ID NUMBER MO3048132<br>COUNTY LOCATION PHELPS | 1965 | X | 2 | 90 | 45 | 0 | 100 | 0 | 0 | 0.0200 | 0.0100 | 0.0005 |
| **WILD OAKS WATER COMPANY**<br>ID NUMBER MO4036310<br>COUNTY LOCATION WAYNE | 1976 | D | 2 | 42 | 14 | 0 | 100 | 0 | 0 | 0.0000 | 0.0080 | 0.0001 |
| **WILDEN HEIGHTS SUBD**<br>ID NUMBER MO5036192<br>COUNTY LOCATION GREENE | 1992 | X | 2 | 52 | 21 | 0 | 100 | 0 | 0 | 0.0580 | 0.0040 | 0.0010 |
| **WILDERNESS CLUB INC**<br>ID NUMBER MO5031102<br>COUNTY LOCATION TANEY | 1995 | E | 2 | 100 | 70 | 0 | 100 | 0 | 0 | 0.1296 | 0.0000 | 0.0300 |
| **WINDSOR BAY**<br>ID NUMBER MO5036168<br>COUNTY LOCATION BARRY | 1989 | X | 2 | 35 | 137 | 0 | 100 | 0 | 0 | 0.1080 | 0.0010 | 0.0110 |
| **WINDSOR ESTATES NURSING HOME**<br>ID NUMBER MO3069006<br>COUNTY LOCATION CAMDEN | 1969 | X | 2 | 70 | 1 | 0 | 100 | 0 | 0 | 0.0000 | 0.0090 | 0.0012 |
| **WINDWOOD ESTATES SUBD**<br>ID NUMBER MO4031196<br>COUNTY LOCATION CAPE GIRARDEAU | 1997 | D | 2 | 45 | 16 | 0 | 100 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 |
| **WINEGARS TEAL BEND SUBD**<br>ID NUMBER MO3036121<br>COUNTY LOCATION BENTON | 1950 | X | 2 | 400 | 140 | 0 | 100 | 0 | 0 | 0.1700 | 0.0150 | 0.0140 |
| **WINTERHAVEN MOBILE HOME ESTATE**<br>ID NUMBER MO5048077<br>COUNTY LOCATION NEWTON | 1990 | E | 2 | 120 | 48 | 0 | 100 | 0 | 0 | 0.0000 | 0.0080 | 0.0002 |
| **WOOD RIDGE ESTATES**<br>ID NUMBER MO5036071<br>COUNTY LOCATION STONE | 1989 | D | 2 | 80 | 32 | 0 | 100 | 0 | 0 | 0.0576 | 0.0040 | 0.0200 |
| **WOODCREST MHP**<br>ID NUMBER MO3048127<br>COUNTY LOCATION PHELPS | 1968 | E | 2 | 292 | 146 | 0 | 100 | 0 | 0 | 0.0900 | 0.0290 | 0.0050 |

Missouri Public Drinking Water

# Surface Water Systems




Perryville
Fort Leonard Wood
Ironton
Fredericktown
Johnson Shut-Ins State Park
Blue Mountain Camp
Springfield
Lamar
Cape Girardeau
Springfield
Sam A Baker State Park
Springfield
Piedmont
Joplin
Neosho
Poplar Bluff
Branson
College of the Ozarks

Former Hulett Lagoon Site
Combined PA/SI
Reference 48

1990 Census of
# Population and Housing
## Summary Population and Housing Characteristics
# Missouri

STOCK # 003-024-07326-9

$ 20.00

Issued August 1991

U.S. Department of Commerce
Robert A. Mosbacher, Secretary
Rockwell A. Schnabel, Deputy Secretary

Economics and Statistics Administration
Michael R. Darby, Under Secretary
for Economic Affairs and Administrator

BUREAU OF THE CENSUS
Barbara Everitt Bryant, Director

# TABLE FINDING GUIDE

## ;ubjects by Type of Geographic Area and Table Number

Subjects covered in this report are shown on the left side, and types of geographic areas are shown at the top. For a description of area classifica-ons, see appendix A. For definitions and explanations of subject characteristics, see appendix B]

| ;ubject | The State | County | Place: By county and county subdivision | Place: Alphabeti-cally for the State | County subdivision: By county | County subdivision: Alphabeti-cally for the State[1] | American Indian and Alaska Native area |
|---|---|---|---|---|---|---|---|
| **OPULATION CHARACTERISTICS** | | | | | | | |
| ge | 1,2 | 1,2 | 1 | 2 | 1 | 2 | 17 |
| amilies and family characteristics | 5,6 | 5,6 | 5 | 6 | 5 | 6 | 18 |
| roup quarters | 5,6 | 5,6 | 5 | 6 | 5 | 6 | ... |
| ispanic origin | 3,4 | 3,4 | 3 | 4 | 3 | 4 | ... |
| ouseholds and household characteristics | 5,6 | 5,6 | 5 | 6 | 5 | 6 | 18 |
| opulation density | 15,16 | 15,16 | 15 | 16 | 15 | 16 | ... |
| ace | 3,4 | 3,4 | 3 | 4 | 3 | 4 | ... |
| ex | 3,4 | 3,4 | 3 | 4 | 3 | 4 | 17 |
| **OUSING CHARACTERISTICS** | | | | | | | |
| ontract rent | 11,12 | 11,12 | 11 | 12 | 11 | 12 | 18 |
| ispanic origin of householder | 13,14 | 13,14 | 13 | 14 | 13 | 14 | ... |
| eals included in rent | 11,12 | 11,12 | 11 | 12 | 11 | 12 | ... |
| ersons per occupied unit | 9,10,11,12 | 9,10,11,12 | 9,11 | 10,12 | 9,11 | 10,12 | ... |
| ersons per room | 7,8 | 7,8 | 7 | 8 | 7 | 8 | ... |
| ace of householder | 13,14 | 13,14 | 13 | 14 | 13 | 14 | ... |
| ooms | 7,8,9,10,11,12 | 7,8,9,10,11,12 | 7,9,11 | 8,10,12 | 7,9,11 | 8,10,12 | ... |
| nure | 9,10,11,12 | 9,10,11,12 | 9,11 | 10,12 | 9,11 | 10,12 | 18 |
| its in structure | 7,8,9,10,11,12 | 7,8,9,10,11,12 | 7,9,11 | 8,10,12 | 7,9,11 | 8,10,12 | ... |
| icancy characteristics | 7,8 | 7,8 | 7 | 8 | 7 | 8 | ... |
| ilue | 9,10 | 9,10 | 9 | 10 | 9 | 10 | 18 |
| **ND AREA** | 15,16 | 15,16 | 15 | 16 | 15 | 16 | 18 |

... Not applicable.

[1] County subdivisions within the State are shown alphabetically with places only in the reports for the following 12 States: Connecticut, Maine, issachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin.

## Table 6. Household, Family, and Group Quarters Characteristics: 1990

[For definitions of terms and meanings of symbols, see text]

| State<br>County<br>Place and [In Selected States] County Subdivision | Persons in households | All households | Family households | | | Nonfamily households | | | | Persons per— | | Persons in group quarters | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Householder living alone | | | | | | | |
| | | | | | | | | 65 years and over | | | | | | |
| | | | Total | Married-couple family | Female householder, no husband present | Total | Total | Total | Female | Household | Family | Total | Institutionalized persons | Other persons in group quarters |
| **The State** | **4 971 676** | **1 961 206** | **1 368 334** | **1 104 723** | **208 175** | **592 872** | **510 684** | **221 516** | **177 384** | **2.54** | **3.08** | **145 397** | **80 854** | **64 543** |
| **COUNTY** | | | | | | | | | | | | | | |
| Adair County | 21 279 | 9 060 | 5 408 | 4 551 | 676 | 3 652 | 2 740 | 1 122 | 908 | 2.35 | 2.96 | 3 298 | 456 | 2 842 |
| Andrew County | 14 340 | 5 429 | 4 185 | 3 673 | 367 | 1 244 | 1 121 | 616 | 489 | 2.64 | 3.06 | 292 | 263 | 29 |
| Atchison County | 6 960 | 2 961 | 2 033 | 1 762 | 200 | 928 | 830 | 481 | 380 | 2.35 | 2.87 | 497 | 173 | 324 |
| Audrain County | 23 009 | 9 205 | 6 667 | 5 670 | 782 | 2 538 | 2 350 | 1 344 | 1 053 | 2.50 | 3.01 | 590 | 527 | 63 |
| Barry County | 27 201 | 10 858 | 8 046 | 6 987 | 759 | 2 812 | 2 554 | 1 420 | 1 102 | 2.51 | 2.95 | 346 | 331 | 15 |
| Barton County | 11 140 | 4 524 | 3 188 | 2 770 | 319 | 1 336 | 1 253 | 768 | 594 | 2.46 | 3.01 | 172 | 110 | 62 |
| Bates County | 14 733 | 5 918 | 4 303 | 3 710 | 432 | 1 615 | 1 503 | 903 | 724 | 2.49 | 2.98 | 292 | 243 | 49 |
| Benton County | 13 651 | 5 764 | 4 212 | 3 727 | 359 | 1 552 | 1 423 | 826 | 607 | 2.37 | 2.80 | 208 | 179 | 29 |
| Bollinger County | 10 457 | 3 946 | 3 057 | 2 662 | 284 | 889 | 814 | 500 | 364 | 2.65 | 3.07 | 162 | 106 | 56 |
| Boone County | 101 696 | 41 937 | 25 573 | 20 602 | 3 965 | 16 364 | 11 531 | 2 770 | 2 248 | 2.42 | 3.01 | 10 683 | 1 145 | 9 538 |
| Buchanan County | 80 649 | 32 486 | 22 319 | 17 669 | 3 717 | 10 167 | 8 990 | 4 500 | 3 646 | 2.48 | 3.04 | 2 434 | 1 698 | 736 |
| Butler County | 38 003 | 15 334 | 10 970 | 8 859 | 1 730 | 4 364 | 3 922 | 2 027 | 1 587 | 2.48 | 2.98 | 762 | 597 | 165 |
| Caldwell County | 8 187 | 3 222 | 2 369 | 2 083 | 217 | 853 | 799 | 503 | 409 | 2.54 | 3.04 | 193 | 193 | - |
| Callaway County | 30 364 | 11 552 | 8 639 | 7 302 | 1 016 | 2 913 | 2 524 | 1 184 | 925 | 2.63 | 3.08 | 2 445 | 1 298 | 1 147 |
| Camden County | 27 190 | 11 305 | 8 596 | 7 685 | 648 | 2 709 | 2 331 | 1 061 | 778 | 2.41 | 2.76 | 305 | 253 | 52 |
| Cape Girardeau County | 58 261 | 23 390 | 16 158 | 13 550 | 2 077 | 7 232 | 5 933 | 2 511 | 2 051 | 2.49 | 3.02 | 3 372 | 792 | 2 580 |
| Carroll County | 10 570 | 4 332 | 3 016 | 2 580 | 322 | 1 316 | 1 234 | 809 | 642 | 2.44 | 3.00 | 178 | 176 | 2 |
| Carter County | 5 456 | 2 128 | 1 520 | 1 266 | 187 | 608 | 564 | 319 | 229 | 2.56 | 3.10 | 59 | 59 | - |
| Cass County | 62 988 | 22 892 | 17 839 | 15 411 | 1 879 | 5 053 | 4 379 | 2 057 | 1 722 | 2.75 | 3.15 | 820 | 634 | 186 |
| Cedar County | 11 833 | 5 003 | 3 525 | 3 080 | 340 | 1 478 | 1 371 | 873 | 681 | 2.37 | 2.86 | 260 | 260 | - |
| Chariton County | 9 055 | 3 661 | 2 597 | 2 295 | 214 | 1 064 | 1 009 | 639 | 477 | 2.47 | 3.02 | 147 | 146 | 1 |
| Christian County | 32 280 | 11 937 | 9 510 | 8 264 | 954 | 2 427 | 2 125 | 966 | 792 | 2.70 | 3.07 | 364 | 364 | - |
| Clark County | 7 450 | 2 859 | 2 108 | 1 813 | 197 | 751 | 701 | 396 | 304 | 2.61 | 3.09 | 97 | 97 | - |
| Clay County | 150 449 | 58 915 | 42 458 | 35 673 | 5 274 | 16 457 | 13 829 | 4 353 | 3 577 | 2.55 | 3.04 | 2 962 | 1 667 | 1 295 |
| Clinton County | 16 253 | 6 112 | 4 639 | 4 029 | 440 | 1 473 | 1 325 | 728 | 589 | 2.66 | 3.11 | 342 | 333 | 9 |
| Cole County | 58 032 | 22 976 | 15 887 | 13 331 | 2 031 | 7 089 | 6 286 | 2 372 | 1 998 | 2.53 | 3.11 | 5 547 | 5 108 | 439 |
| Cooper County | 13 561 | 5 359 | 3 903 | 3 360 | 417 | 1 456 | 1 338 | 787 | 634 | 2.53 | 3.02 | 1 274 | 1 080 | 194 |
| Crawford County | 18 901 | 7 299 | 5 455 | 4 722 | 538 | 1 844 | 1 677 | 938 | 731 | 2.59 | 3.05 | 272 | 259 | 13 |
| Dade County | 7 235 | 2 976 | 2 098 | 1 846 | 182 | 878 | 824 | 515 | 400 | 2.43 | 2.96 | 214 | 211 | 3 |
| Dallas County | 12 507 | 4 899 | 3 648 | 3 158 | 355 | 1 251 | 1 158 | 703 | 531 | 2.55 | 3.02 | 139 | 121 | 18 |
| Daviess County | 7 765 | 3 040 | 2 211 | 1 976 | 172 | 829 | 776 | 520 | 420 | 2.55 | 3.08 | 100 | 100 | - |
| DeKalb County | 7 781 | 3 054 | 2 246 | 2 000 | 176 | 808 | 763 | 498 | 404 | 2.55 | 3.05 | 2 186 | 2 178 | 8 |
| Dent County | 13 499 | 5 327 | 3 938 | 3 394 | 435 | 1 389 | 1 270 | 787 | 630 | 2.53 | 3.00 | 203 | 157 | 46 |
| Douglas County | 11 761 | 4 587 | 3 409 | 2 993 | 291 | 1 178 | 1 069 | 614 | 479 | 2.56 | 3.03 | 115 | 102 | 13 |
| Dunklin County | 32 522 | 13 128 | 9 292 | 7 345 | 1 614 | 3 836 | 3 566 | 2 102 | 1 721 | 2.48 | 3.01 | 590 | 552 | 38 |
| Franklin County | 79 786 | 28 856 | 22 246 | 18 984 | 2 426 | 6 610 | 5 783 | 2 793 | 2 227 | 2.76 | 3.20 | 817 | 767 | 50 |
| Gasconade County | 13 735 | 5 543 | 3 959 | 3 461 | 342 | 1 584 | 1 430 | 851 | 656 | 2.48 | 2.99 | 271 | 263 | 8 |
| Gentry County | 6 618 | 2 756 | 1 909 | 1 682 | 172 | 847 | 808 | 556 | 466 | 2.40 | 2.96 | 230 | 213 | 17 |
| Greene County | 197 756 | 81 463 | 54 525 | 45 018 | 7 502 | 26 938 | 21 635 | 8 686 | 7 256 | 2.43 | 2.96 | 10 193 | 3 294 | 6 899 |
| Grundy County | 10 277 | 4 346 | 2 994 | 2 594 | 311 | 1 352 | 1 264 | 799 | 653 | 2.36 | 2.92 | 259 | 249 | 10 |
| Harrison County | 8 281 | 3 574 | 2 460 | 2 173 | 207 | 1 114 | 1 060 | 676 | 534 | 2.32 | 2.86 | 188 | 188 | - |
| Henry County | 19 700 | 8 189 | 5 689 | 4 837 | 642 | 2 500 | 2 289 | 1 400 | 1 114 | 2.41 | 2.94 | 344 | 309 | 35 |
| Hickory County | 7 224 | 3 183 | 2 349 | 2 123 | 164 | 834 | 776 | 485 | 350 | 2.27 | 2.67 | 111 | 111 | - |
| Holt County | 5 906 | 2 440 | 1 689 | 1 503 | 126 | 751 | 702 | 478 | 365 | 2.42 | 2.99 | 128 | 128 | - |
| Howard County | 8 898 | 3 571 | 2 518 | 2 114 | 303 | 1 053 | 960 | 598 | 469 | 2.49 | 3.03 | 733 | 219 | 514 |
| Howell County | 30 876 | 12 283 | 9 027 | 7 683 | 1 036 | 3 256 | 3 002 | 1 707 | 1 370 | 2.51 | 2.98 | 571 | 513 | 58 |
| Iron County | 10 308 | 3 995 | 2 970 | 2 520 | 347 | 1 025 | 937 | 554 | 423 | 2.58 | 3.04 | 418 | 353 | 65 |
| Jackson County | 621 967 | 252 582 | 164 361 | 121 736 | 34 400 | 88 221 | 74 760 | 26 937 | 21 661 | 2.46 | 3.08 | 11 265 | 7 634 | 3 631 |
| Jasper County | 88 285 | 36 134 | 24 890 | 20 428 | 3 549 | 11 244 | 9 904 | 4 885 | 3 991 | 2.44 | 2.98 | 2 180 | 888 | 1 292 |
| Jefferson County | 169 796 | 59 199 | 47 211 | 39 763 | 5 432 | 11 988 | 9 859 | 3 433 | 2 757 | 2.87 | 3.23 | 1 584 | 1 399 | 185 |
| Johnson County | 37 913 | 14 579 | 10 213 | 8 823 | 1 007 | 4 366 | 3 153 | 1 189 | 975 | 2.60 | 3.08 | 4 601 | 357 | 4 244 |
| Knox County | 4 366 | 1 819 | 1 273 | 1 111 | 114 | 546 | 511 | 324 | 267 | 2.40 | 2.94 | 116 | 77 | 39 |
| Laclede County | 26 650 | 10 420 | 7 749 | 6 652 | 831 | 2 671 | 2 421 | 1 324 | 1 044 | 2.56 | 3.01 | 508 | 211 | 297 |
| Lafayette County | 30 169 | 11 732 | 8 570 | 7 299 | 921 | 3 162 | 2 907 | 1 714 | 1 386 | 2.57 | 3.07 | 938 | 741 | 197 |
| Lawrence County | 29 670 | 11 724 | 8 487 | 7 255 | 928 | 3 237 | 2 950 | 1 733 | 1 384 | 2.53 | 3.03 | 566 | 555 | 11 |
| Lewis County | 9 326 | 3 745 | 2 655 | 2 284 | 264 | 1 090 | 989 | 578 | 461 | 2.49 | 3.02 | 907 | 253 | 654 |
| Lincoln County | 28 539 | 10 316 | 7 913 | 6 851 | 758 | 2 403 | 2 137 | 1 045 | 817 | 2.77 | 3.21 | 353 | 285 | 68 |
| Linn County | 13 544 | 5 704 | 3 837 | 3 346 | 373 | 1 867 | 1 745 | 1 111 | 892 | 2.37 | 2.97 | 341 | 339 | 2 |
| Livingston County | 13 798 | 5 645 | 3 910 | 3 345 | 437 | 1 735 | 1 618 | 944 | 769 | 2.44 | 3.01 | 794 | 794 | - |
| McDonald County | 16 681 | 6 386 | 4 784 | 4 058 | 504 | 1 602 | 1 434 | 760 | 603 | 2.61 | 3.05 | 257 | 156 | 101 |
| Macon County | 15 017 | 6 160 | 4 376 | 3 829 | 405 | 1 784 | 1 663 | 1 029 | 838 | 2.44 | 2.96 | 328 | 326 | 2 |
| Madison County | 10 966 | 4 344 | 3 205 | 2 683 | 388 | 1 139 | 1 041 | 623 | 486 | 2.52 | 2.99 | 161 | 161 | - |
| Maries County | 7 877 | 3 028 | 2 271 | 1 989 | 207 | 757 | 711 | 391 | 296 | 2.60 | 3.08 | 99 | 99 | - |
| Marion County | 26 826 | 10 728 | 7 412 | 6 137 | 1 013 | 3 316 | 3 042 | 1 675 | 1 367 | 2.50 | 3.08 | 856 | 541 | 315 |
| Mercer County | 3 655 | 1 577 | 1 079 | 972 | 66 | 498 | 470 | 307 | 245 | 2.32 | 2.88 | 68 | 61 | 7 |
| Miller County | 20 456 | 7 977 | 5 740 | 4 819 | 681 | 2 237 | 1 999 | 1 003 | 775 | 2.56 | 3.07 | 244 | 204 | 40 |
| Mississippi County | 14 218 | 5 411 | 3 968 | 2 908 | 869 | 1 443 | 1 336 | 781 | 635 | 2.63 | 3.13 | 224 | 224 | - |
| Moniteau County | 11 876 | 4 583 | 3 328 | 2 896 | 324 | 1 255 | 1 169 | 707 | 575 | 2.59 | 3.13 | 422 | 422 | - |
| Monroe County | 8 900 | 3 471 | 2 466 | 2 175 | 217 | 1 005 | 935 | 528 | 411 | 2.56 | 3.14 | 204 | 167 | 37 |
| Montgomery County | 11 047 | 4 341 | 3 114 | 2 668 | 326 | 1 227 | 1 133 | 713 | 550 | 2.54 | 3.06 | 308 | 308 | - |
| Morgan County | 15 287 | 6 269 | 4 629 | 4 097 | 374 | 1 640 | 1 477 | 836 | 595 | 2.44 | 2.87 | 287 | 222 | 65 |
| New Madrid County | 20 624 | 7 795 | 5 726 | 4 448 | 1 066 | 2 069 | 1 897 | 1 067 | 858 | 2.65 | 3.15 | 304 | 304 | - |
| Newton County | 43 745 | 16 886 | 12 678 | 10 982 | 1 267 | 4 208 | 3 736 | 1 937 | 1 540 | 2.59 | 3.04 | 700 | 471 | 229 |
| Nodaway County | 13 905 | 7 620 | 4 996 | 4 330 | 497 | 2 624 | 2 065 | 1 025 | 816 | 2.48 | 3.05 | 2 804 | 252 | 2 552 |
| Oregon County | 9 359 | 3 851 | 2 820 | 2 406 | 285 | 1 031 | 971 | 580 | 440 | 2.43 | 2.89 | 111 | 108 | 3 |
| Osage County | 11 848 | 4 262 | 3 181 | 2 800 | 253 | 1 081 | 950 | 545 | 414 | 2.78 | 3.31 | 170 | 170 | - |
| Ozark County | 8 495 | 3 486 | 2 616 | 2 319 | 210 | 870 | 799 | 469 | 336 | 2.44 | 2.86 | 103 | 88 | 15 |
| Pemiscot County | 21 549 | 8 210 | 5 757 | 4 086 | 1 411 | 2 453 | 2 268 | 1 340 | 1 043 | 2.62 | 3.21 | 372 | 327 | 45 |
| Perry County | 16 296 | 6 111 | 4 537 | 3 934 | 427 | 1 574 | 1 439 | 857 | 662 | 2.67 | 3.17 | 352 | 314 | 38 |
| Pettis County | 35 077 | 14 056 | 9 947 | 8 298 | 1 266 | 4 109 | 3 636 | 1 915 | 1 538 | 2.50 | 3.00 | 360 | 190 | 170 |
| Phelps County | 32 673 | 13 277 | 9 125 | 7 705 | 1 106 | 4 152 | 3 459 | 1 427 | 1 158 | 2.46 | 2.98 | 2 575 | 690 | 1 885 |
| Pike County | 15 629 | 6 083 | 4 380 | 3 670 | 511 | 1 703 | 1 565 | 907 | 719 | 2.57 | 3.10 | 340 | 305 | 35 |
| Platte County | 57 117 | 22 142 | 16 077 | 13 694 | 1 754 | 6 065 | 5 063 | 1 198 | 925 | 2.58 | 3.06 | 750 | 502 | 248 |
| Polk County | 20 455 | 8 031 | 5 899 | 5 189 | 523 | 2 132 | 1 837 | 1 059 | 848 | 2.55 | 3.00 | 1 371 | 454 | 917 |
| Pulaski County | 35 214 | 12 397 | 9 882 | 8 451 | 1 110 | 2 515 | 2 235 | 905 | 709 | 2.84 | 3.23 | 6 093 | 231 | 5 862 |
| Putnam County | 4 994 | 2 166 | 1 472 | 1 296 | 132 | 694 | 657 | 446 | 336 | 2.31 | 2.87 | 85 | 59 | 26 |
| Ralls County | 8 392 | 3 226 | 2 474 | 2 199 | 196 | 752 | 692 | 413 | 295 | 2.60 | 3.03 | 84 | 60 | 24 |
| Randolph County | 22 387 | 8 943 | 6 235 | 5 242 | 788 | 2 708 | 2 409 | 1 360 | 1 104 | 2.50 | 3.05 | 1 983 | 1 843 | 140 |
| Ray County | 21 747 | 8 020 | 6 215 | 5 405 | 592 | 1 805 | 1 640 | 902 | 713 | 2.71 | 3.13 | 224 | 224 | - |
| Reynolds County | 6 558 | 2 542 | 1 950 | 1 677 | 191 | 592 | 534 | 306 | 244 | 2.58 | 2.97 | 103 | 87 | 16 |

# Table 6. Household, Family, and Group Quarters Characteristics: 1990—Con.

[For definitions of terms and meanings of symbols, see text]

| State<br>County<br>Place and [In Selected States] County Subdivision | Persons in households | All households | Family households: Total | Family households: Married-couple family | Family households: Female householder, no husband present | Nonfamily households: Total | Householder living alone: Total | Householder living alone, 65 years and over: Total | Householder living alone, 65 years and over: Female | Persons per—: Household | Persons per—: Family | Persons in group quarters: Total | Persons in group quarters: Institutionalized persons | Persons in group quarters: Other persons in group quarters |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PLACE AND COUNTY SUBDIVISION—Con.** | | | | | | | | | | | | | | |
| Bel-Nor village, St. Louis County | 2 644 | 1 092 | 735 | 526 | 178 | 357 | 328 | 129 | 112 | 2.42 | 3.04 | 291 | 112 | 179 |
| Bel-Ridge village, St. Louis County | 3 185 | 1 176 | 807 | 444 | 299 | 369 | 313 | 81 | 58 | 2.71 | 3.28 | 14 | 14 | – |
| Belton city, Cass County | 17 881 | 6 393 | 4 873 | 4 003 | 697 | 1 520 | 1 280 | 400 | 338 | 2.80 | 3.23 | 269 | 109 | 160 |
| Benton city, Scott County | 575 | 239 | 169 | 151 | 13 | 70 | 67 | 44 | 38 | 2.41 | 2.95 | – | – | – |
| Benton City town, Audrain County | 139 | 49 | 42 | 39 | 1 | 7 | 6 | 4 | 3 | 2.84 | 3.10 | – | – | – |
| Berger city, Franklin County | 247 | 94 | 71 | 58 | 12 | 23 | 22 | 9 | 7 | 2.63 | 3.11 | – | – | – |
| Berkeley city, St. Louis County | 12 423 | 4 280 | 3 279 | 1 946 | 1 120 | 1 001 | 853 | 262 | 200 | 2.90 | 3.34 | 27 | 16 | 11 |
| Bernie city, Stoddard County | 1 847 | 783 | 546 | 427 | 98 | 237 | 224 | 139 | 114 | 2.36 | 2.88 | – | – | – |
| Bertrand city, Mississippi County | 655 | 266 | 202 | 156 | 40 | 64 | 62 | 35 | 29 | 2.46 | 2.83 | 37 | 37 | – |
| Bethany city, Harrison County | 2 817 | 1 307 | 815 | 696 | 96 | 492 | 474 | 302 | 250 | 2.16 | 2.79 | 188 | 188 | – |
| Bethel town, Shelby County | 117 | 61 | 31 | 24 | 7 | 30 | 29 | 20 | 13 | 1.92 | 2.74 | – | – | – |
| Beverly Hills city, St. Louis County | 660 | 275 | 173 | 97 | 64 | 102 | 97 | 39 | 24 | 2.40 | 3.08 | – | – | – |
| Bevier city, Macon County | 643 | 271 | 179 | 150 | 26 | 92 | 81 | 51 | 41 | 2.37 | 2.97 | – | – | – |
| Bigelow village, Holt County | 32 | 13 | 9 | 6 | 3 | 4 | 2 | 1 | – | 2.46 | 2.89 | – | – | – |
| Big Lake village, Holt County | 170 | 87 | 59 | 54 | 5 | 28 | 27 | 11 | 6 | 1.95 | 2.37 | – | – | – |
| Billings city, Christian County | 989 | 403 | 285 | 229 | 42 | 118 | 110 | 64 | 50 | 2.45 | 2.99 | – | – | – |
| Birch Tree city, Shannon County | 599 | 255 | 166 | 147 | 16 | 89 | 84 | 51 | 43 | 2.35 | 3.00 | – | – | – |
| Birmingham village, Clay County | 222 | 78 | 59 | 51 | 7 | 19 | 18 | 12 | 11 | 2.85 | 3.37 | – | – | – |
| Bismarck city, St. Francois County | 1 557 | 604 | 441 | 355 | 69 | 163 | 152 | 104 | 83 | 2.58 | 3.06 | 22 | 11 | 11 |
| Blackburn city | 308 | 110 | 83 | 76 | 3 | 27 | 26 | 19 | 14 | 2.80 | 3.29 | – | – | – |
| Lafayette County | 22 | 7 | 6 | 6 | – | 1 | 1 | 1 | 1 | 3.14 | 3.50 | – | – | – |
| Saline County | 286 | 103 | 77 | 70 | 3 | 26 | 25 | 18 | 13 | 2.78 | 3.27 | – | – | – |
| Black Jack city, St. Louis County | 5 857 | 2 000 | 1 596 | 1 295 | 234 | 404 | 339 | 121 | 106 | 2.93 | 3.33 | 271 | 271 | – |
| Blackwater city, Cooper County | 221 | 92 | 64 | 54 | 5 | 28 | 24 | 15 | 11 | 2.40 | 2.86 | – | – | – |
| Blairstown city, Henry County | 185 | 75 | 50 | 43 | 3 | 25 | 23 | 12 | 9 | 2.47 | 3.10 | – | – | – |
| Bland city | 640 | 257 | 176 | 141 | 20 | 81 | 69 | 39 | 33 | 2.49 | 3.05 | 11 | 3 | 8 |
| Gasconade County | 640 | 257 | 176 | 141 | 20 | 81 | 69 | 39 | 33 | 2.49 | 3.05 | 11 | 3 | 8 |
| Osage County | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Blodgett town, Scott County | 202 | 81 | 58 | 43 | 12 | 23 | 21 | 9 | 8 | 2.49 | 3.00 | – | – | – |
| Bloomfield city, Stoddard County | 1 709 | 744 | 494 | 391 | 86 | 250 | 236 | 157 | 139 | 2.30 | 2.88 | 91 | 91 | – |
| Bloomsdale city, Ste. Genevieve County | 353 | 142 | 102 | 92 | 5 | 40 | 39 | 28 | 23 | 2.49 | 3.04 | – | – | – |
| Blue Eye town, Stone County | 112 | 45 | 29 | 26 | 2 | 16 | 16 | 9 | 6 | 2.49 | 3.31 | – | – | – |
| Blue Springs city, Jackson County | 39 896 | 13 529 | 11 055 | 9 426 | 1 285 | 2 474 | 2 012 | 616 | 520 | 2.95 | 3.29 | 257 | 240 | 17 |
| Blythedale village, Harrison County | 130 | 58 | 33 | 28 | 4 | 25 | 24 | 17 | 14 | 2.24 | 3.12 | – | – | – |
| Bogard city, Carroll County | 228 | 93 | 69 | 57 | 7 | 24 | 23 | 15 | 12 | 2.45 | 2.87 | – | – | – |
| Bolckow city, Andrew County | 253 | 93 | 65 | 58 | 7 | 28 | 28 | 11 | 6 | 2.72 | 3.46 | – | – | – |
| Bolivar city, Polk County | 5 866 | 2 607 | 1 620 | 1 372 | 205 | 987 | 816 | 492 | 423 | 2.25 | 2.82 | 979 | 237 | 742 |
| Bonne Terre city, St. Francois County | 3 819 | 1 474 | 1 037 | 819 | 180 | 437 | 405 | 264 | 228 | 2.59 | 3.17 | 52 | 41 | |
| Boonville city, Cooper County | 5 870 | 2 503 | 1 660 | 1 338 | 263 | 843 | 782 | 454 | 384 | 2.35 | 2.92 | 1 225 | 1 031 | |
| Bosworth city, Carroll County | 334 | 149 | 103 | 95 | 6 | 46 | 43 | 30 | 25 | 2.24 | 2.71 | – | – | |
| Bourbon city, Crawford County | 1 188 | 479 | 311 | 263 | 38 | 168 | 157 | 98 | 83 | 2.48 | 3.16 | – | – | – |
| Bowling Green city, Pike County | 2 822 | 1 191 | 762 | 581 | 142 | 429 | 405 | 231 | 195 | 2.37 | 3.04 | 154 | 119 | 35 |
| Bragg City town, Pemiscot County | 117 | 44 | 35 | 33 | 2 | 9 | 9 | 7 | 3 | 2.66 | 3.06 | – | – | – |
| Brandsville city, Howell County | 167 | 56 | 44 | 33 | 8 | 12 | 11 | 6 | 6 | 2.98 | 3.39 | – | – | – |
| Branson city, Taney County | 3 603 | 1 678 | 1 070 | 914 | 127 | 608 | 556 | 342 | 294 | 2.15 | 2.70 | 103 | 70 | 33 |
| Brashear city, Adair County | 318 | 123 | 93 | 81 | 10 | 30 | 30 | 25 | 22 | 2.59 | 3.10 | – | – | – |
| Braymer city, Caldwell County | 886 | 388 | 257 | 199 | 50 | 131 | 122 | 84 | 71 | 2.28 | 2.65 | – | – | – |
| Breckenridge city, Caldwell County | 418 | 188 | 117 | 94 | 14 | 71 | 64 | 43 | 37 | 2.22 | 2.83 | – | – | – |
| Breckenridge Hills village, St. Louis County | 5 404 | 2 091 | 1 449 | 950 | 396 | 642 | 523 | 202 | 151 | 2.58 | 3.08 | – | – | – |
| Brentwood city, St. Louis County | 8 149 | 4 025 | 2 130 | 1 725 | 333 | 1 895 | 1 657 | 484 | 395 | 2.02 | 2.78 | 1 | 1 | – |
| Bridgeton city, St. Louis County | 17 238 | 6 793 | 4 933 | 4 075 | 646 | 1 860 | 1 534 | 555 | 463 | 2.54 | 3.00 | 541 | 541 | – |
| Brimson village, Grundy County | 72 | 27 | 21 | 21 | – | 6 | 6 | 3 | 3 | 2.67 | 3.14 | – | – | – |
| Bronaugh city, Vernon County | 211 | 88 | 61 | 48 | 9 | 27 | 27 | 13 | 10 | 2.40 | 2.95 | – | – | – |
| Brookfield city, Linn County | 4 711 | 2 133 | 1 301 | 1 093 | 168 | 832 | 771 | 483 | 395 | 2.21 | 2.88 | 177 | 176 | 1 |
| Brookline village, Greene County | 283 | 111 | 93 | 84 | 3 | 18 | 17 | 6 | 5 | 2.55 | 2.82 | – | – | – |
| Brooklyn Heights village, Jasper County | 116 | 46 | 35 | 31 | 3 | 11 | 7 | 1 | – | 2.52 | 2.77 | – | – | – |
| Browning city | 331 | 146 | 94 | 75 | 14 | 52 | 50 | 28 | 24 | 2.27 | 2.86 | – | – | – |
| Linn County | 255 | 109 | 75 | 63 | 9 | 34 | 32 | 15 | 13 | 2.34 | 2.84 | – | – | – |
| Sullivan County | 76 | 37 | 19 | 12 | 5 | 18 | 18 | 13 | 11 | 2.05 | 2.95 | – | – | – |
| Brownington town, Henry County | 84 | 38 | 26 | 22 | – | 12 | 12 | 6 | 3 | 2.21 | 2.77 | – | – | – |
| Brumley town, Miller County | 81 | 32 | 25 | 16 | 8 | 7 | 5 | 2 | 2 | 2.53 | 2.72 | – | – | – |
| Brunswick city, Chariton County | 1 023 | 480 | 283 | 219 | 49 | 197 | 186 | 121 | 97 | 2.13 | 2.82 | 51 | 50 | 1 |
| Bucklin city, Linn County | 616 | 277 | 168 | 142 | 22 | 109 | 105 | 75 | 56 | 2.22 | 2.95 | – | – | – |
| Buckner city, Jackson County | 2 873 | 1 007 | 782 | 617 | 129 | 225 | 208 | 107 | 93 | 2.85 | 3.28 | – | – | – |
| Buffalo city, Dallas County | 2 312 | 1 039 | 644 | 479 | 137 | 395 | 377 | 264 | 220 | 2.23 | 2.88 | 102 | 102 | – |
| Bunceton city, Cooper County | 341 | 144 | 95 | 78 | 12 | 49 | 44 | 27 | 24 | 2.37 | 2.94 | – | – | – |
| Bunker city | 390 | 152 | 104 | 83 | 15 | 48 | 45 | 30 | 22 | 2.57 | 3.22 | – | – | – |
| Dent County | 159 | 59 | 39 | 34 | 4 | 20 | 17 | 13 | 9 | 2.69 | 3.46 | – | – | – |
| Reynolds County | 231 | 93 | 65 | 49 | 11 | 28 | 28 | 17 | 13 | 2.48 | 3.08 | – | – | – |
| Burgess town, Barton County | 97 | 31 | 22 | 20 | 2 | 9 | 7 | 5 | 3 | 3.13 | 3.91 | – | – | – |
| Burlington Junction city, Nodaway County | 624 | 267 | 169 | 147 | 18 | 98 | 97 | 63 | 56 | 2.34 | 3.06 | 10 | – | 10 |
| Butler city, Bates County | 3 913 | 1 717 | 1 133 | 903 | 180 | 584 | 545 | 360 | 309 | 2.28 | 2.84 | 186 | 186 | – |
| Butterfield village, Barry County | 248 | 98 | 73 | 65 | 3 | 25 | 21 | 11 | 10 | 2.53 | 2.96 | – | – | – |
| Byrnes Mill city, Jefferson County | 1 578 | 559 | 438 | 374 | 44 | 121 | 87 | 28 | 23 | 2.82 | 3.20 | – | – | – |
| Cabool city, Texas County | 1 931 | 871 | 546 | 429 | 105 | 325 | 315 | 211 | 177 | 2.22 | 2.88 | 75 | 75 | – |
| Cainsville city, Harrison County | 387 | 189 | 116 | 99 | 9 | 73 | 71 | 48 | 37 | 2.05 | 2.68 | – | – | – |
| Cairo village, Randolph County | 282 | 110 | 74 | 64 | 9 | 36 | 36 | 26 | 19 | 2.56 | 3.30 | – | – | – |
| Caledonia village, Washington County | 142 | 65 | 38 | 30 | 4 | 27 | 27 | 25 | 21 | 2.18 | 3.00 | – | – | – |
| Calhoun city, Henry County | 450 | 187 | 126 | 103 | 20 | 61 | 58 | 39 | 27 | 2.41 | 3.03 | – | – | – |
| California city, Moniteau County | 3 333 | 1 471 | 927 | 751 | 146 | 544 | 516 | 323 | 283 | 2.27 | 2.93 | 132 | 132 | – |
| Callao city, Macon County | 332 | 137 | 93 | 82 | 10 | 44 | 36 | 20 | 13 | 2.42 | 3.00 | – | – | – |
| Calverton Park village, St. Louis County | 1 404 | 523 | 408 | 343 | 56 | 115 | 101 | 43 | 30 | 2.68 | 3.10 | – | – | – |
| Camden city, Ray County | 238 | 92 | 66 | 55 | 6 | 26 | 22 | 11 | 9 | 2.59 | 3.03 | – | – | – |
| Camden Point city, Platte County | 373 | 125 | 106 | 96 | 7 | 19 | 16 | 10 | 9 | 2.98 | 3.28 | – | – | – |
| Camdenton city, Camden County | 2 544 | 1 105 | 717 | 540 | 148 | 388 | 352 | 201 | 178 | 2.30 | 2.90 | 17 | 17 | |
| Cameron city | 4 632 | 1 989 | 1 293 | 1 054 | 198 | 696 | 647 | 375 | 337 | 2.33 | 2.96 | 199 | 199 | |
| Clinton County | 3 737 | 1 544 | 1 053 | 853 | 164 | 491 | 446 | 237 | 208 | 2.42 | 2.99 | 54 | 54 | |
| De Kalb County | 895 | 445 | 240 | 201 | 34 | 205 | 201 | 138 | 129 | 2.01 | 2.83 | 145 | 145 | |
| Campbell city, Dunklin County | 2 075 | 904 | 576 | 441 | 114 | 328 | 305 | 206 | 159 | 2.30 | 2.94 | 90 | 90 | – |
| Canalou city, New Madrid County | 319 | 128 | 97 | 86 | 9 | 31 | 30 | 18 | 14 | 2.49 | 2.95 | – | – | – |
| Canton city, Lewis County | 1 969 | 870 | 533 | 444 | 63 | 337 | 304 | 178 | 154 | 2.26 | 2.91 | 654 | – | 654 |

Former Hulett Lagoon Site
Combined PA/SI
Reference 49

MODINE

**Certified Mail P 917 752 129**
**Return Receipt Requested**

July 2, 1997

Darleen Westcott
Environmental Engineer
Hazardous Waste Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

Dear Ms. Westcott:

Enclosed are the latest quarterly groundwater sampling results from the well installed at the Modine Manufacturing Company Camdenton site. The results show 120 ppb in MW-4. If you have any questions, please contact me at (414) 636-1649 or at the letterhead address.

Sincerely,

Thomas S. Sanicola
Environmental Engineer

Enclosure
cc: Modine Manufacturing - Camdenton
N. Gladding - Bryan Cave
file(2)

DAMES & MOORE

A DAMES & MOORE GROUP COMPANY

2135 East Sunshine, Suite 105
Springfield, Missouri 65804
417 881 3927 Tel
417 881 6361 Fax

June 30, 1997

Mr. Thomas S. Sanicola
Environmental Engineer
Modine Manufacturing Company
1500 DeKoven Avenue
Racine, Wisconsin 53403

**RE: JUNE 1997 QUARTERLY SAMPLING ANALYTICAL RESULTS FOR THE MODINE HEAT TRANSFER, INC. SITE CAMDENTON, MISSOURI**

Dear Mr. Sanicola:

The purpose of this letter is to present the analytical results for the June 1997 quarterly sampling event at the Modine Heat Transfer, Inc. Site located in Camdenton, Missouri. The groundwater sample was collected on June 4, 1997 and was analyzed for volatile organic compounds (VOCs) with Trichloroethene (TCE) as the primary constituent of concern. The laboratory reporting limit for TCE was 5 parts per billion (ppb).

The results are as follows:

| Well Identification | Location | Results |
|---|---|---|
| MW-1 | West of facility | Quarterly Sampling no longer required |
| MW-2 | East of facility | Quarterly Sampling no longer required |
| MW-3 | Southwest of facility | Quarterly Sampling no longer required |
| MW-4 | Northwest of facility | TCE detected at 120 ppb |

Enclosed is a copy of the laboratory analytical results for this sampling event and a table comparing the results over the last seven sampling events.

Please call either Mr. Price at (314) 993-4599 or Ms. Francis at (417) 881-3927 to discuss any comments or questions you may have.

Very truly yours,

**DAMES & MOORE**

DYW
Miesche M. Francis

Miesche M. Francis
Staff Geologist

D. DYW
Daniel J. Price

Daniel J. Price, P.G.
Senior Geologist

Enclosures

c: Don Mans - Modine Heat Transfer, Inc.

**GROUNDWATER ANALYTICAL RESULTS**
**MODINE HEAT TRANSFER, INC.**
**CAMDENTON, MISSOURI**
**AUGUST 1995 - JUNE 1997**

| TCE CONCENTRATIONS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Well ID** | **8/16, 22/95** | **11/16/95** | **2/15, 16/96** | **5/16/96** | **8/20/96** | **12/12/96** | **2/28/97, 3/3/97** | **6/4/97** |
| **MW-1** | 11.8 | 9.4 | ND (Dup. 5.4) | ND | ND | ND (Dup. ND) | NT | NT |
| **MW-2** | ND (Dup. ND) | ND | ND | ND | NT | NT | NT | NT |
| **MW-3** | 8.0 | ND | 6.6 | ND | ND (Dup. ND) | NS | ND | NT |
| **MW-4** | 88.9 | 142 (Dup. 154) | 173.0 | 10.0 | NS | NS | 34 (Dup. 37) | 120 |

Results in this table are presented in parts per billion (ppb).
NT - Not Tested
ND - Not Detected at or above 5 ppb
NS - Not Sampled due to insufficient volume

AMERICAN TECHNICAL & ANALYTICAL SERVICES, INC.
875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 • FAX (314) 434-0080

June 18, 1997

Miesche Francis
Dames & Moore
2135 E Sunshine Street, Suite 105
Springfield, MO 65804

RE: ATAS #19097.01
#27397-005-045 - Modine

Dear Mr. Francis:

Enclosed is the analytical report for the sample received in our laboratory on June 6, 1997.

If, in your review, you should have any questions or require additional information, please call Rhonda Tinker, Assistant Project Manager, or me at (314) 434-4570.

Thank you for choosing ATAS for your analytical needs.

Sincerely,

Richard H. Mannz

Richard H. Mannz
Project Manager

Enclosures

RHM/dms

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: DAMES & MOORE
2135 E SUNSHINE STREET, SUITE 105
SPRINGFIELD, MO 65804
ATTN: MIESCHE FRANCIS

REPORT: 1909701V(286)

DATE : 06-18-97

SAMPLE MATRIX : WATER
ATAS # : 19097.01
DATE SUBMITTED: 06-06-97
DATE ANALYZED : 06-12-97
METHOD REF. : SW846-8240, EPA METHODOLOGY
PROJECT : #27397-005-045 - MODINE
SAMPLE ID : MW-4

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

| VOLATILES | R.L. | RESULTS |
|---|---|---|
| TRICHLOROETHENE | 5 | 120 |

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(80-116) 101% BROMOFLUOROBENZENE(86-115) 103%
1,2-DICHLOROETHANE-D4(76-114) 103%

B = ANALYTE DETECTED IN METHOD BLANK, POSSIBLY BELOW THE REPORTING LIMIT.
RL = REPORTING LIMIT; DEFINED AS THE PRACTICAL QUANTITATION LIMIT PLUS ANY DILUTION, POSITIVE VALUES BELOW THIS LIMIT WERE NOT REPORTED.
ND = NOT DETECTED ABOVE REPORTING LIMIT

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: DAMES & MOORE
2135 E SUNSHINE STREET, SUITE 105
SPRINGFIELD, MO 65804
ATTN: MIESCHE FRANCIS

REPORT: 1909701V(286)

DATE : 06-18-97

SAMPLE MATRIX : WATER
ATAS # : METHOD BLANK
DATE SUBMITTED: 06-06-97
DATE ANALYZED : 06-12-97
METHOD REF. : SW846-8240, EPA METHODOLOGY
PROJECT : #27397-005-045 - MODINE
SAMPLE ID : METHOD BLANK

RESULTS REPORTED IN ug/L OR Parts Per Billion (PPB)

| VOLATILES | R.L. | RESULTS |
|---|---|---|
| TRICHLOROETHENE | 5 | ND |

**QA/QC SURROGATE RECOVERIES**

TOLUENE-d8(80-116) 101% BROMOFLUOROBENZENE(86-115) 103%
1,2-DICHLOROETHANE-D4(76-114) 86%

B = ANALYTE DETECTED IN METHOD BLANK, POSSIBLY BELOW THE REPORTING LIMIT.
RL = REPORTING LIMIT; DEFINED AS THE PRACTICAL QUANTITATION LIMIT PLUS ANY DILUTION, POSITIVE VALUES BELOW THIS LIMIT WERE NOT REPORTED.
= NOT DETECTED ABOVE REPORTING LIMIT

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

**LABORATORY QUALITY CONTROL SEQUENCE**

SAMPLE MATRIX : WATER REPORT DATE: 06-18-97
DATE ANALYZED : 06-12-97
METHOD REF. : SW846-8240, EPA METHODOLOGY

**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY**

| COMPOUND | 19085.05 MS % REC. | 19085.05 MSD % REC. | RPD | QC RPD | ADVISORY LIMITS |
|---|---|---|---|---|---|
| 1,1-DICHLOROETHENE | 90 | 86 | 5 | 16 | 70-127 |
| TRICHLOROETHENE | 88 | 88 | 0 | 11 | 75-111 |
| BENZENE | 90 | 88 | 2 | 12 | 83-120 |
| TOLUENE | 90 | 88 | 2 | 10 | 80-122 |
| CHLOROBENZENE | 86 | 86 | 0 | 8 | 86-109 |

* = VALUES OUTSIDE OF ADVISORY LIMITS

*ATAS*

# AMERICAN TECHNICAL & ANALYTICAL SERVICES, Inc.

PAGE 1 OF 1

875 Fee Fee Road • Maryland Heights, MO 63043-3211 • Office (314) 434-4570 • FAX (314) 434-0080

## CHAIN OF CUSTODY RECORD

ATAS Client Name: Dames & Moore

Project Name: Modine

Project #: 27397-005-045

Form Completed By: M. Francis

PO #:

Type of Analysis: VOC 8240

Lab Use Only — Initials: LM — Date: 6-6-97 — Location/Temp: 2 13E

| Sample ID | Sample Date | Sample Time | Sample Matrix | Grab | Comp | No. of Containers | VOC 8240 | Preservative Ice | Preservative Chemical (see below) | Remarks | Lab Use Only |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-4 | 6-4-97 | 1220 | Water | ✓ | | 2 | X | ✓ | E | TCE at a reporting limit of 5ppb. | 19097.01 |

| | Relinquished by: | Received by: | Relinquished by: | Received by: |
|---|---|---|---|---|
| Signature | [signature] | [signature] | | |
| Printed Name | Miesche Francis | L. Massenberg | | |
| Firm | Dames & Moore | ATAS | | |
| Date/Time | 6-4-97 1230 | 6-6-97 0945 | | |

Turnaround Requirements
- ___ 1 to 2 working days
- ___ 3 working days
- ___ 5 working days
- X 10 working days
- ___ 15 working days

Preservative codes
- A - none
- B - $HNO_3$
- C - $H_2SO_4$
- D - NaOH
- E - HCl
- F - ___

SEND RESULTS TO (Name & Company): Miesche Francis Dames & Moore

Original to ATAS/Copy to Client

Continental Analytical
S E R V I C E S , I N C .



Client: Missouri Dept. of Health
Attn: Larry Evert
307 W. McCarty
Jefferson City, MO 65101

Date Sample Rptd: 04/01/93
Date Sample Recd: 03/18/93
CAS File No: 92-5364
CAS Order No: 15740
Client P.O.:

Lab Number: 93031353
Sample Description: Mulberry Well 3010130Camdenton

Date Sampled: 03/16/93
Time Sampled: 0715

| Analysis | Concentration | Units | Date Analyzed | Book/Page |
|---|---|---|---|---|
| MDNR Regulated Vocs | | | 03/25/93 | / |
| 1,1,1-Trichloroethane | ND(0.5) | µg/L | | 1546/35 |
| 1,1-Dichloroethylene | ND(0.5) | µg/L | | 1546/35 |
| 1,2-Dichloroethane | ND(0.5) | µg/L | | 1546/35 |
| 1,2-Dichloropropane | ND(0.5) | µg/L | | 1546/35 |
| Benzene | ND(0.5) | µg/L | | 1546/35 |
| Carbon Tetrachloride | ND(0.5) | µg/L | | 1546/35 |
| cis-1,2-Dichloroethylene | ND(0.5) | µg/L | | 1546/35 |
| Chlorobenzene | ND(0.5) | µg/L | | 1546/35 |
| Ethylbenzene | ND(0.5) | µg/L | | 1546/35 |
| o-Dichlorobenzene | ND(0.5) | µg/L | | 1546/35 |
| p-Dichlorobenzene | ND(0.5) | µg/L | | 1546/35 |
| Styrene | ND(0.5) | µg/L | | 1546/35 |
| Tetrachloroethylene | ND(0.5) | µg/L | | 1546/35 |
| Toluene | ND(0.5) | µg/L | | 1546/35 |
| trans-1,2-Dichloroethylene | ND(0.5) | µg/L | | 1546/35 |
| Trichloroethylene | 2.1 | µg/L | | 1546/35 |
| Vinyl Chloride/Chloroethene | ND(0.5) | µg/L | | 1546/35 |
| Xylene | ND(0.5) | µg/L | | 1546/35 |
| MDNR Unregulated Vocs | | | 03/25/93 | / |
| 1,1,1,2-Tetrachloroethane | ND(0.5) | µg/L | | 1546/35 |
| 1,1,2,2-Tetrachloroethane | ND(0.5) | µg/L | | 1546/35 |
| 1,1,2-Trichloroethane | ND(0.5) | µg/L | | 1546/35 |
| 1,1-Dichloroethane | ND(0.5) | µg/L | | 1546/35 |
| 1,1-Dichloropropene | ND(0.5) | µg/L | | 1546/35 |
| 1,2,3-Trichloropropane | ND(0.5) | µg/L | | 1546/35 |
| 1,2,4-Trichlorobenzene | ND(0.5) Q | µg/L | | 1546/35 |
| 1,3-Dichloropropane | ND(0.5) | µg/L | | 1546/35 |
| 2,2-Dichloropropane | ND(0.5) Q | µg/L | | 1546/35 |
| Bromobenzene | ND(0.5) | µg/L | | 1546/35 |
| Bromodichloromethane | ND(0.5) | µg/L | | 1546/35 |
| Bromoform | ND(0.5) | µg/L | | 1546/35 |
| Bromomethane | ND(0.5) | µg/L | | 1546/35 |
| Chloroethane | ND(0.5) | µg/L | | 1546/35 |
| Chloroform | ND(0.5) | µg/L | | 1546/35 |
| Chloromethane | I | µg/L | | 1546/35 |
| cis-1,3-Dichloropropene | ND(0.5) | µg/L | | 1546/35 |
| Dibromochloromethane | ND(0.5) Q | µg/L | | 1546/35 |
| Dibromomethane | ND(0.5) | µg/L | | 1546/35 |
| Dichloromethane | ND(0.5) | µg/L | | 1546/35 |
| m-Dichlorobenzene | ND(0.5) | µg/L | | 1546/35 |

-Continued-

CONTINENTAL ANALYTICAL SERVICES, INC.

LABORATORY REPORT



Client: Missouri Dept. of Health
Lab Number: 93031353

| Analysis | Concentration | Units | Date Analyzed | Book/Page |
|---|---|---|---|---|
| o-Chlorotoluene | ND(0.5) | µg/L | | 1546/35 |
| p-Chlorotoluene | ND(0.5) | µg/L | | 1546/35 |
| trans-1,3-Dichloropropene | ND(0.5) | µg/L | | 1546/35 |

| Analysis | Date Prepared | QC Batch | Analyst | Analytical Method |
|---|---|---|---|---|
| MDNR Regulated Vocs | NA | 1GC4084 | TEB | MDNR/502.2M |
| MDNR Unregulated Vocs | NA | 1GC4084 | TEB | MDNR/502.2M |

Q - This compound did not meet the method Quality Control criteria.

I - Matrix interferences were noted at the time of analysis.

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations part 136, July 1, 1986 or in EPA Publication, SW-846, 3rd edition, Nov. 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

# Continental Analytical
SERVICES, INC.



Client: Missouri Dept. of Health
Attn: Larry Evert
307 W. McCarty
Jefferson City, MO 65101

Date Sample Rptd: 04/01/93
Date Sample Recd: 03/18/93
CAS File No: 92-5364
CAS Order No: 15740
Client P.O.:

Lab Number: 93031354
Sample Description: Blair Well 3010130 Camdenton

Date Sampled: 03/16/93
Time Sampled: 0729

| Analysis | Concentration | Units | Date Analyzed | Book/Page |
|---|---|---|---|---|
| MDNR Regulated Vocs | | | 03/27/93 | / |
| 1,1,1-Trichloroethane | ND(0.5) | µg/L | | 1536/28 |
| 1,1-Dichloroethylene | ND(0.5) | µg/L | | 1536/28 |
| 1,2-Dichloroethane | ND(0.5) | µg/L | | 1536/28 |
| 1,2-Dichloropropane | ND(0.5) | µg/L | | 1536/28 |
| Benzene | ND(0.5) | µg/L | | 1536/28 |
| Carbon Tetrachloride | ND(0.5) | µg/L | | 1536/28 |
| cis-1,2-Dichloroethylene | ND(0.5) | µg/L | | 1536/28 |
| Chlorobenzene | ND(0.5) | µg/L | | 1536/28 |
| Ethylbenzene | ND(0.5) | µg/L | | 1536/28 |
| o-Dichlorobenzene | ND(0.5) | µg/L | | 1536/28 |
| p-Dichlorobenzene | ND(0.5) | µg/L | | 1536/28 |
| Styrene | ND(0.5) | µg/L | | 1536/28 |
| Tetrachloroethylene | ND(0.5) | µg/L | | 1536/28 |
| Toluene | ND(0.5) | µg/L | | 1536/28 |
| trans-1,2-Dichloroethylene | ND(0.5) | µg/L | | 1536/28 |
| Trichloroethylene | ND(0.5) | µg/L | | 1536/28 |
| Vinyl Chloride/Chloroethene | ND(0.5) | µg/L | | 1536/28 |
| Xylene | ND(0.5) | µg/L | | 1536/28 |
| MDNR Unregulated Vocs | | | 03/27/93 | / |
| 1,1,1,2-Tetrachloroethane | ND(0.5) | µg/L | | 1536/28 |
| 1,1,2,2-Tetrachloroethane | ND(0.5) Q | µg/L | | 1536/28 |
| 1,1,2-Trichloroethane | ND(0.5) | µg/L | | 1536/28 |
| 1,1-Dichloroethane | ND(0.5) | µg/L | | 1536/28 |
| 1,1-Dichloropropene | ND(0.5) | µg/L | | 1536/28 |
| 1,2,3-Trichloropropane | ND(0.5) Q | µg/L | | 1536/28 |
| 1,2,4-Trichlorobenzene | ND(0.5) | µg/L | | 1536/28 |
| 1,3-Dichloropropane | ND(0.5) | µg/L | | 1536/28 |
| 2,2-Dichloropropane | ND(0.5) | µg/L | | 1536/28 |
| Bromobenzene | ND(0.5) | µg/L | | 1536/28 |
| Bromodichloromethane | ND(0.5) | µg/L | | 1536/28 |
| Bromoform | ND(0.5) Q | µg/L | | 1536/28 |
| Bromomethane | ND(0.5) | µg/L | | 1536/28 |
| Chloroethane | ND(0.5) | µg/L | | 1536/28 |
| Chloroform | ND(0.5) | µg/L | | 1536/28 |
| Chloromethane | ND(0.5) | µg/L | | 1536/28 |
| cis-1,3-Dichloropropene | ND(0.5) | µg/L | | 1536/28 |
| Dibromochloromethane | ND(0.5) Q | µg/L | | 1536/28 |
| Dibromomethane | ND(0.5) | µg/L | | 1536/28 |
| Dichloromethane | ND(0.5) | µg/L | | 1536/28 |
| m-Dichlorobenzene | ND(0.5) | µg/L | | 1536/28 |

-Continued-

CONTINENTAL ANALYTICAL SERVICES, INC.

LABORATORY REPORT



Client: Missouri Dept. of Health
Lab Number: 93031354

| Analysis | Concentration | Units | Date Analyzed | Book/Page |
|---|---|---|---|---|
| o-Chlorotoluene | ND(0.5) | µg/L | | 1536/28 |
| p-Chlorotoluene | ND(0.5) | µg/L | | 1536/28 |
| trans-1,3-Dichloropropene | ND(0.5) | µg/L | | 1536/28 |

| Analysis | Date Prepared | QC Batch | Analyst | Analytical Method |
|---|---|---|---|---|
| MDNR Regulated Vocs | NA | 1GC3085 | DKT | MDNR/502.2M |
| MDNR Unregulated Vocs | NA | 1GC3085 | DKT | MDNR/502.2M |

Q - This compound did not meet the method Quality Control criteria.

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations part 136, July 1, 1986 or in EPA Publication, SW-846, 3rd edition, Nov. 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

# Continental Analytical
S E R V I C E S , I N C



| | |
|---|---|
| Client: Missouri Dept. of Health | Date Sample Rptd: 04/01/93 |
| Attn: Larry Evert | Date Sample Recd: 03/18/93 |
| 307 W. McCarty | CAS File No: 92-5364 |
| Jefferson City, MO 65101 | CAS Order No: 15740 |
| | Client P.O.: |

Lab Number: 93031355 Date Sampled: 03/16/93
Sample Description: Rodeo Well 3010130 Camdenton Time Sampled: 0740

| Analysis | Concentration | Units | Date Analyzed | Book/Page |
|---|---|---|---|---|
| MDNR Regulated Vocs | | | 03/27/93 | / |
| 1,1,1-Trichloroethane | ND(0.5) | µg/L | | 1536/29 |
| 1,1-Dichloroethylene | ND(0.5) | µg/L | | 1536/29 |
| 1,2-Dichloroethane | ND(0.5) | µg/L | | 1536/29 |
| 1,2-Dichloropropane | ND(0.5) | µg/L | | 1536/29 |
| Benzene | ND(0.5) | µg/L | | 1536/29 |
| Carbon Tetrachloride | ND(0.5) | µg/L | | 1536/29 |
| cis-1,2-Dichloroethylene | ND(0.5) | µg/L | | 1536/29 |
| Chlorobenzene | ND(0.5) | µg/L | | 1536/29 |
| Ethylbenzene | ND(0.5) | µg/L | | 1536/29 |
| o-Dichlorobenzene | ND(0.5) | µg/L | | 1536/29 |
| p-Dichlorobenzene | ND(0.5) | µg/L | | 1536/29 |
| Styrene | ND(0.5) | µg/L | | 1536/29 |
| Tetrachloroethylene | ND(0.5) | µg/L | | 1536/29 |
| Toluene | ND(0.5) | µg/L | | 1536/29 |
| trans-1,2-Dichloroethylene | ND(0.5) | µg/L | | 1536/29 |
| Trichloroethylene | ND(0.5) | µg/L | | 1536/29 |
| Vinyl Chloride/Chloroethene | ND(0.5) | µg/L | | 1536/29 |
| Xylene | ND(0.5) | µg/L | | 1536/29 |
| MDNR Unregulated Vocs | | | 03/27/93 | / |
| 1,1,1,2-Tetrachloroethane | ND(0.5) | µg/L | | 1536/29 |
| 1,1,2,2-Tetrachloroethane | ND(0.5) Q | µg/L | | 1536/29 |
| 1,1,2-Trichloroethane | ND(0.5) | µg/L | | 1536/29 |
| 1,1-Dichloroethane | ND(0.5) | µg/L | | 1536/29 |
| 1,1-Dichloropropene | ND(0.5) | µg/L | | 1536/29 |
| 1,2,3-Trichloropropane | ND(0.5) Q | µg/L | | 1536/29 |
| 1,2,4-Trichlorobenzene | ND(0.5) | µg/L | | 1536/29 |
| 1,3-Dichloropropane | ND(0.5) | µg/L | | 1536/29 |
| 2,2-Dichloropropane | ND(0.5) | µg/L | | 1536/29 |
| Bromobenzene | ND(0.5) | µg/L | | 1536/29 |
| Bromodichloromethane | ND(0.5) | µg/L | | 1536/29 |
| Bromoform | ND(0.5) Q | µg/L | | 1536/29 |
| Bromomethane | ND(0.5) | µg/L | | 1536/29 |
| Chloroethane | ND(0.5) | µg/L | | 1536/29 |
| Chloroform | ND(0.5) | µg/L | | 1536/29 |
| Chloromethane | ND(0.5) | µg/L | | 1536/29 |
| cis-1,3-Dichloropropene | ND(0.5) | µg/L | | 1536/29 |
| Dibromochloromethane | ND(0.5) Q | µg/L | | 1536/29 |
| Dibromomethane | ND(0.5) | µg/L | | 1536/29 |
| Dichloromethane | ND(0.5) | µg/L | | 1536/29 |
| m-Dichlorobenzene | ND(0.5) | µg/L | | 1536/29 |

-Continued-

1804 Glendale Road • Salina, Kansas 67401
913-827-1273 • 800-535-3076 • FAX 913-823-7830

CONTINENTAL ANALYTICAL SERVICES, INC.

LABORATORY REPORT 

Client: Missouri Dept. of Health
Lab Number: 93031355

| Analysis | Concentration | Units | Date Analyzed | Book/Page |
|---|---|---|---|---|
| o-Chlorotoluene | ND(0.5) | µg/L | | 1536/29 |
| p-Chlorotoluene | ND(0.5) | µg/L | | 1536/29 |
| trans-1,3-Dichloropropene | ND(0.5) | µg/L | | 1536/29 |

| Analysis | Date Prepared | QC Batch | Analyst | Analytical Method |
|---|---|---|---|---|
| MDNR Regulated Vocs | NA | 1GC3085 | DKT | MDNR/502.2M |
| MDNR Unregulated Vocs | NA | 1GC3085 | DKT | MDNR/502.2M |

Q - This compound did not meet the method Quality Control criteria.

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations part 136, July 1, 1986 or in EPA Publication, SW-846, 3rd edition, Nov. 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

# Continental Analytical
SERVICES, INC



Client: Missouri Dept. of Health
Attn: Larry Evert
307 W. McCarty
Jefferson City, MO 65101

Date Sample Rptd: 04/01/93
Date Sample Recd: 03/18/93
CAS File No: 92-5364
CAS Order No: 15740
Client P.O.:

Lab Number: 93031356
Sample Description: Trip Blank 3010130 Camdenton

Date Sampled: / /
Time Sampled:

| Analysis | Concentration | Units | Date Analyzed | Book/Page |
|---|---|---|---|---|
| MDNR Regulated Vocs | | | 03/26/93 | / |
| 1,1,1-Trichloroethane | ND(0.5) | µg/L | | 1546/36 |
| 1,1-Dichloroethylene | ND(0.5) | µg/L | | 1546/36 |
| 1,2-Dichloroethane | ND(0.5) | µg/L | | 1546/36 |
| 1,2-Dichloropropane | ND(0.5) | µg/L | | 1546/36 |
| Benzene | ND(0.5) | µg/L | | 1546/36 |
| Carbon Tetrachloride | ND(0.5) | µg/L | | 1546/36 |
| cis-1,2-Dichloroethylene | ND(0.5) | µg/L | | 1546/36 |
| Chlorobenzene | ND(0.5) | µg/L | | 1546/36 |
| Ethylbenzene | ND(0.5) | µg/L | | 1546/36 |
| o-Dichlorobenzene | ND(0.5) | µg/L | | 1546/36 |
| p-Dichlorobenzene | ND(0.5) | µg/L | | 1546/36 |
| Styrene | ND(0.5) | µg/L | | 1546/36 |
| Tetrachloroethylene | ND(0.5) | µg/L | | 1546/36 |
| Toluene | ND(0.5) | µg/L | | 1546/36 |
| trans-1,2-Dichloroethylene | ND(0.5) | µg/L | | 1546/36 |
| Trichloroethylene | ND(0.5) | µg/L | | 1546/36 |
| Vinyl Chloride/Chloroethene | ND(0.5) | µg/L | | 1546/36 |
| Xylene | ND(0.5) | µg/L | | 1546/36 |
| MDNR Unregulated Vocs | | | 03/26/93 | / |
| 1,1,1,2-Tetrachloroethane | ND(0.5) | µg/L | | 1546/36 |
| 1,1,2,2-Tetrachloroethane | ND(0.5) | µg/L | | 1546/36 |
| 1,1,2-Trichloroethane | ND(0.5) | µg/L | | 1546/36 |
| 1,1-Dichloroethane | ND(0.5) | µg/L | | 1546/36 |
| 1,1-Dichloropropene | ND(0.5) | µg/L | | 1546/36 |
| 1,2,3-Trichloropropane | ND(0.5) | µg/L | | 1546/36 |
| 1,2,4-Trichlorobenzene | ND(0.5) Q | µg/L | | 1546/36 |
| 1,3-Dichloropropane | ND(0.5) | µg/L | | 1546/36 |
| 2,2-Dichloropropane | ND(0.5) Q | µg/L | | 1546/36 |
| Bromobenzene | ND(0.5) | µg/L | | 1546/36 |
| Bromodichloromethane | ND(0.5) | µg/L | | 1546/36 |
| Bromoform | ND(0.5) Q | µg/L | | 1546/36 |
| Bromomethane | ND(0.5) | µg/L | | 1546/36 |
| Chloroethane | ND(0.5) | µg/L | | 1546/36 |
| Chloroform | ND(0.5) | µg/L | | 1546/36 |
| Chloromethane | I | µg/L | | 1546/36 |
| cis-1,3-Dichloropropene | ND(0.5) | µg/L | | 1546/36 |
| Dibromochloromethane | ND(0.5) Q | µg/L | | 1546/36 |
| Dibromomethane | ND(0.5) | µg/L | | 1546/36 |
| Dichloromethane | ND(0.5) | µg/L | | 1546/36 |
| m-Dichlorobenzene | ND(0.5) | µg/L | | 1546/36 |

-Continued-

CONTINENTAL ANALYTICAL SERVICES, INC.



Client: Missouri Dept. of Health
Lab Number: 93031356

| Analysis | Concentration | Units | Date Analyzed | Book/Page |
|---|---|---|---|---|
| o-Chlorotoluene | ND(0.5) | μg/L | | 1546/36 |
| p-Chlorotoluene | ND(0.5) | μg/L | | 1546/36 |
| trans-1,3-Dichloropropene | ND(0.5) | μg/L | | 1546/36 |

| Analysis | Date Prepared | QC Batch | Analyst | Analytical Method |
|---|---|---|---|---|
| MDNR Regulated Vocs | NA | 1GC4084 | TEB | MDNR/502.2M |
| MDNR Unregulated Vocs | NA | 1GC4084 | TEB | MDNR/502.2M |

Q - This compound did not meet the method Quality Control criteria.

I - Matrix interferences were noted at the time of analysis.

Laboratory analyses were performed on samples utilizing procedures published in Title 40 of the Code of Federal Regulations part 136, July 1, 1986 or in EPA Publication, SW-846, 3rd edition, Nov. 1986. ND(), where noted, indicates none detected with the detection limit in parentheses.

Samples will be retained for thirty days unless otherwise notified.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

STATE OF MISSOURI
Mel Carnahan Governor • David A. Shorr Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No. 94-C602

Reported to: TERRY TIMMONS
Affiliation: PDW

Date: 5/13/94
Project Code: 3404/3000

Sample Description:
CAMDENTON, MULBERRY WELL
MO3010130

Collected by: BOB MARSHALL
Affiliation: MISC

Date: 04/27/94

| PARAMETERS | RESULTS |
|---|---|
| VOC Results: | |
| Benzene | <0.5 ug/L |
| Bromobenzene | <1.0 ug/L |
| Bromochloromethane | <1.0 ug/L |
| Bromodichloromethane | <1.0 ug/L |
| Bromoform | <2.5 ug/L |
| Bromomethane | <2.5 ug/L |
| n-Butylbenzene | <2.0 ug/L |
| sec-Butylbenzene | <2.0 ug/L |
| tert-Butylbenzene | <2.0 ug/L |
| Carbon tetrachloride | <0.5 ug/L |
| Chlorobenzene | <0.5 ug/L |
| Chloroethane | <2.5 ug/L |
| Chloroform | <1.0 ug/L |
| Chloromethane | <2.5 ug/L |
| 2-Chlorotoluene | <2.0 ug/L |
| 4-Chlorotoluene | <2.0 ug/L |
| Dibromochloromethane | <1.0 ug/L |
| 1,2-Dibromo-3-chloropropane | <5.0 ug/L |
| 1,2-Dibromoethane | <2.0 ug/L |
| Dibromomethane | <1.0 ug/L |

STATE OF MISSOURI
Mel Carnahan Governor • David A. Shorr Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P O Box 176 Jefferson City, MO 65102-0176


Sample no. 94-C602
Date 5/13/94

| PARAMETERS | RESULTS |
|---|---|
| 1,1,2-Trichloroethane | <0.5 ug/L |
| Trichloroethene | <0.5 ug/L |
| Trichlorofluoromethane | <2.5 ug/L |
| 1,2,3-Trichloropropane | <1.0 ug/L |
| 1,2,4-Trimethylbenzene | <1.0 ug/L |
| 1,3,5-Trimethylbenzene | <2.0 ug/L |
| Vinyl Chloride | <0.5 ug/L |
| o-Xylene | <0.5 ug/L |
| m&p-xylene | <0.5 ug/L |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P O Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

BOB MARSHALL
CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A758

Sample Number: 97-A466

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 24, 1997
Date Collected: January 29, 1997
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 3.8 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Report Date: February 24, 1997

Lab Number: 97-A758
Sample Number: 97-A466

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chlorobenz | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 2.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
Mel Carnahan Governor • David A. Shorr Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Sample Number: 97-0486
Lab Number: 97-A2244

| | | | |
|---|---|---|---|
| Reported To: | JIM HOULIHAN | Report Date: | 3/17/97 |
| Affiliation: | JCRO | Date Collected: | 3/12/97 |
| Project Code: | 3404/3000 | Date Received: | 3/12/97 |

| | |
|---|---|
| Sample Collected by: | JIM HOULIHAN, JCRO |
| PWS Supply Name: | CAMDENTON |
| PWS Identification: | MO3010130 |
| PWS County: | CAMDEN |
| Sampling Location: | MULBERRY WELL |
| Sample Description: | CONFIRMATION SAMPLE |

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 3.8 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |

Report Date: March 17, 1997

Lab Number: 97-A2244
Sample Number: 97-0486

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chlorobenz | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 2.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level  -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: TERRY TIMMONS, PDWP

STATE OF MISSOURI Mel Carnahan, Governor • David A. Shorr, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

BOB MARSHALL
CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A4822

Sample Number: 97-F101

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 13, 1997
Date Collected: June 3, 1997
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 4.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |

Report Date: June 13, 1997

Lab Number: 97-A4822
Sample Number: 97-F101

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chlorobenz | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 2.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI

Mel Carnahan Governor • David A. Shorr Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

BOB MARSHALL
CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A7751

Sample Number: 97-I658

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: September 4, 1997
Date Collected: August 26, 1997 PWS ID: MO3010130
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 4.3 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |

Report Date: September 4, 1997

Lab Number: 97-A7751
Sample Number: 97-I658

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chlorobenz | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 2.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI

Mel Carnahan, Governor • David A. Shorr, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P O Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE - CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A7752

Sample Number: 97-I659

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: September 4, 1997
Date Collected: August 26, 1997
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 4.3 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |

Page: 2
Report Date: September 4, 1997

Lab Number: 97-A7752
Sample Number: 97-I659

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chlorobenz | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 2.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI Mel Carnahan, Governor • David A. Shorr, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A11630

Sample Number: 97-L708

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: December 18, 1997
Date Collected: December 1, 1997 PWS ID: MO3010130
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 4.4 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |

Report Date: December 18, 1997

Lab Number: 97-A11630
Sample Number: 97-L708

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 2.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A896

Sample Number: 98-B383

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 18, 1998
Date Collected: February 2, 1998 PWS ID: MO3010130
Sample Location: MULBERRY WELL, SPECIAL REQUEST
PWS Name: CAMDENTON

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 6.3 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Report Date: February 18, 1998

Lab Number: 98-A896
Sample Number: 98-B383

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

STATE OF MISSOURI

Mel Carnahan Governor • Stephen M. Mahfood Director

2 6 1998

# DEPARTMENT OF NATURAL RESOURCES

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A1807

Sample Number: 98-C482

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: March 11, 1998
Date Collected: February 17, 1998
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 5.2 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |

Report Date: March 11, 1998

Lab Number: 98-A1807
Sample Number: 98-C482

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level          -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED
APR 15 1998

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A3749

Sample Number: 98-B784

## RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: March 31, 1998
Date Collected: March 25, 1998
Sample Location: MULBERRY WELL
PWS Name: CAMDENTON
PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 3.6 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Page: 2
Report Date: March 31, 1998

Lab Number: 98-A3749
Sample Number: 98-B784

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level    -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

NOV 02 1998

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A4982

Sample Number: 98-F440

## RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: May 7, 1998
Date Collected: April 23, 1998
Sample Location: MULBERRY WELL HOUSE
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 4.1 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Report Date: May 7, 1998

Lab Number: 98-A4982
Sample Number: 98-F440

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level    -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

NOV 0 2 1998

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P O Box 176 Jefferson City MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6299

Sample Number: 98-H069

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 9, 1998
Date Collected: May 21, 1998
Sample Location: MULBERRY WELL
PWS Name: CAMDENTON

PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 11.8 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |

RECEIVED

JUN 1 9 1998

Report Date: June 9, 1998

Lab Number: 98-A6299
Sample Number: 98-H069

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

NOV 0 2 1998

STATE OF MISSOURI
Mel Carnahan Governor • Stephen M. Mahfood Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6820

Sample Number: 98-F519

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 18, 1998
Date Collected: June 8, 1998
Sample Location: MULBERRY WELL
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 5.1 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Page: 2
Report Date: June 18, 1998

Lab Number: 98-A6820
Sample Number: 98-F519

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

PO Box 176 Jefferson City, MO 65102-0176

RECEIVED NOV 02 1998

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE - CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A14822

Sample Number: 98-U834

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: September 9, 1998
Date Collected: August 25, 1998
Sample Location: MULBERRY WELL
PWS Name: CAMDENTON

PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 200 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 4.2 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 1.0 | 1000 | ug/L |

Report Date: September 9, 1998

Lab Number: 98-A14822
Sample Number: 98-U834

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level    -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

**Missouri Department of Natural Resources**

E-mail is for official department use only. Copies of messages may be archived indefinitely and reviewed as appropriate.

From Dianne Holtmeyer on 01/25/99 03:30:50 PM

To: Valerie Wilder/HWP/DEQ/MODNR@MODNR
cc: TERRY TIMMONS@NetTalk @ MODNR
Subject: Camdenton

Fourth quarter TCE results for samples collected on 12/2/98 at Camdenton (MO3010130) were:

Blair Well - <0.50 ug/L (No detect)
Rodeo Well - <0.50 ug/L (No detect)
Mulberry Well - 4.40 ug/L
Hickory Well - <0.50 ug/L (No detect)

Dianne Holtmeyer
Missouri Department of Natural Resources
Public Drinking Water Program
P.O. Box 176
Jefferson City, MO 65102
Phone: (573) 526-3479/Fax: (573) 751-3110
Internet mail: nrholtd@mail.dnr.state.mo.us

RECEIVED

MAR 2 2 1999

HAZARDOUS WASTE PROGRAM
DEPARTMENT OF NATURAL RESOURCES

STATE OF MISSOURI

Mel Carnahan Governor • Stephen M Mahfood Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 99-A402

Sample Number: 9901502

## RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: March 10, 1999
Date Collected: January 13, 1999 PWS ID: MO3010130
Sample Location: MULBERRY WELL, SPECIAL REQUEST
PWS Name: CAMDENTON

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 2.5 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | 1.3 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 26.2 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Recycled Paper

Lab Number: 99-A402
Sample Number: 9901502

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 20.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 5.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 0.5 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 2.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No. 94-C603

Reported to: TERRY TIMMONS
Affiliation: PDW

Date: 5/13/94
Project Code: 3404/3000

Sample Description:
CAMDENTON, BLAIR WELL
MO3010130

Collected by: BOB MARSHALL
Affiliation: MISC

Date: 04/27/94

| PARAMETERS | RESULTS |
|---|---|
| VOC Results: | |
| Benzene | <0.5 ug/L |
| Bromobenzene | <1.0 ug/L |
| Bromochloromethane | <1.0 ug/L |
| Bromodichloromethane | <1.0 ug/L |
| Bromoform | <2.5 ug/L |
| Bromomethane | <2.5 ug/L |
| n-Butylbenzene | <2.0 ug/L |
| sec-Butylbenzene | <2.0 ug/L |
| tert-Butylbenzene | <2.0 ug/L |
| Carbon tetrachloride | <0.5 ug/L |
| Chlorobenzene | <0.5 ug/L |
| Chloroethane | <2.5 ug/L |
| Chloroform | <1.0 ug/L |
| Chloromethane | <2.5 ug/L |
| 2-Chlorotoluene | <2.0 ug/L |
| 4-Chlorotoluene | <2.0 ug/L |
| Dibromochloromethane | <1.0 ug/L |
| 1,2-Dibromo-3-chloropropane | <5.0 ug/L |
| 1,2-Dibromoethane | <2.0 ug/L |
| Dibromomethane | <1.0 ug/L |

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P O. Box 176 Jefferson City, MO 65102-0176


Sample no. 94-C603
Date 5/13/94

| PARAMETERS | RESULTS |
|---|---|
| 1,2-Dichlorobenzene | <0.5 ug/L |
| 1,3-Dichlorobenzene | <1.0 ug/L |
| 1,4-Dichlorobenzene | <0.5 ug/L |
| Dichlorodifluoromethane | <2.5 ug/L |
| 1,1-Dichloroethane | <1.0 ug/L |
| 1,2-Dichloroethane | <0.5 ug/L |
| 1,1-Dichloroethene | <0.5 ug/L |
| cis-1,2-Dichloroethene | <0.5 ug/L |
| trans-1,2-Dichloroethene | <0.5 ug/L |
| 1,2-Dichloropropane | <0.5 ug/L |
| 1,3-Dichloropropane | <2.0 ug/L |
| 2,2-Dichloropropane | <1.0 ug/L |
| 1,1-Dichloropropene | <1.0 ug/L |
| cis-1,3-Dichloropropene | <2.0 ug/L |
| trans-1,3-Dichloropropene | <1.0 ug/L |
| Ethylbenzene | <0.5 ug/L |
| Hexachlorobutadiene | <1.0 ug/L |
| Isopropylbenzene | <2.0 ug/L |
| p-Isopropyltoluene | <2.0 ug/L |
| Methylene Chloride | <0.5 ug/L |
| Naphthalene | <2.0 ug/L |
| n-Propylbenzene | <2.0 ug/L |
| Styrene | <0.5 ug/L |
| 1,1,1,2-Tetrachloroethane | <1.0 ug/L |
| 1,1,2,2-Tetrachloroethane | <1.0 ug/L |
| Tetrachloroethene | <0.5 ug/L |
| Toluene | <0.5 ug/L |
| 1,2,3-Trichlorobenzene | <2.0 ug/L |
| 1,2,4-Trichlorobenzene | <0.5 ug/L |
| 1,1,1-Trichloroethane | <0.5 ug/L |

STATE OF MISSOURI
Mel Carnahan Governor • David A. Shorr Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P O. Box 176 Jefferson City, MO 65102-0176


Sample no. 94-C603
Date 5/13/94

| PARAMETERS | RESULTS |
|---|---|
| 1,1,2-Trichloroethane | <0.5 ug/L |
| Trichloroethene | <0.5 ug/L |
| Trichlorofluoromethane | <2.5 ug/L |
| 1,2,3-Trichloropropane | <1.0 ug/L |
| 1,2,4-Trimethylbenzene | <1.0 ug/L |
| 1,3,5-Trimethylbenzene | <2.0 ug/L |
| Vinyl Chloride | <0.5 ug/L |
| o-Xylene | <0.5 ug/L |
| m&p-xylene | <0.5 ug/L |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P O Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

BOB MARSHALL
CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A759

Sample Number: 97-A467

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 24, 1997
Date Collected: January 29, 1997
Sample Location: BLAIR ST WELL HOUSE
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Tcluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Report Date: February 24, 1997

Lab Number: 97-A759
Sample Number: 97-A467

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chlorobenz | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 2.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A898

Sample Number: 98-B385

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 10, 1998
Date Collected: February 2, 1998 PWS ID: MO3010130
Sample Location: BLAIR WELL, SPECIAL REQUEST
PWS Name: CAMDENTON

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Report Date: February 10, 1998

Lab Number: 98-A898
Sample Number: 98-B385

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED
23 1998

RECEIVED

FEB 23 1998

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Date: 2/18/98
To: Terry Timmons, PDWP
From: Mary King, ESP
Subject: Samples with Results Greater than PDWP Monitoring Trigger

| Sample Number | MO ID | Supplyname / Analyte | Results | MCL | Trigger |
|---|---|---|---|---|---|
| 98-B383 | MO3010130 | CAMDENTON | | | |
| | | Trichloroethene | 6.3 ug/L | 5.0 | 0.5 |

STATE OF MISSOURI Mel Carnahan, Governor • Stephen M. Mahfood, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A3751

Sample Number: 98-B786

### RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: March 31, 1998
Date Collected: March 25, 1998
Sample Location: BLAIR WELL
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Report Date: March 31, 1998

Lab Number: 98-A3751
Sample Number: 98-B786

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

NOV 02 1998

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A4981

Sample Number: 98-F439

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: May 7, 1998
Date Collected: April 23, 1998
Sample Location: BLAIR STREET
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Page: 2
Report Date: May 7, 1998

Lab Number: 98-A4981
Sample Number: 98-F439

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

NOV 02 1998

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P O Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6300

Sample Number: 98-H070

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 8, 1998
Date Collected: May 21, 1998
Sample Location: BLAIR WELL
PWS Name: CAMDENTON

PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |

Report Date: June 8, 1998

Lab Number: 98-A6300
Sample Number: 98-H070

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

NOV 0 2 1998

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P O Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6822

Sample Number: 98-F521

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 15, 1998
Date Collected: June 8, 1998
Sample Location: BLAIR WELL
PWS Name: CAMDENTON
PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Lab Number: 98-A6822
Sample Number: 98-F521

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE - CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A14824

Sample Number: 98-U836

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: September 9, 1998
Date Collected: August 25, 1998
Sample Location: BLAIR WELL
PWS Name: CAMDENTON

PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 200 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 1.0 | 1000 | ug/L |

Report Date: September 9, 1998

Lab Number: 98-A14824
Sample Number: 98-U836

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level    -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI
Mel Carnahan Governor • David A. Shorr Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM
RESULT OF SAMPLE ANALYSIS

Sample No. 94-C601

Reported to: TERRY TIMMONS
Affiliation: PDW

Date: 5/13/94
Project Code: 3404/3000

Sample Description:
CAMDENTON, RODEO WELL
MO3010130

Collected by: BOB MARSHALL
Affiliation: MISC

Date: 04/27/94

| PARAMETERS | RESULTS |
|---|---|
| VOC Results: | |
| Benzene | <0.5 ug/L |
| Bromobenzene | <1.0 ug/L |
| Bromochloromethane | <1.0 ug/L |
| Bromodichloromethane | <1.0 ug/L |
| Bromoform | <2.5 ug/L |
| Bromomethane | <2.5 ug/L |
| n-Butylbenzene | <2.0 ug/L |
| sec-Butylbenzene | <2.0 ug/L |
| tert-Butylbenzene | <2.0 ug/L |
| Carbon tetrachloride | <0.5 ug/L |
| Chlorobenzene | <0.5 ug/L |
| Chloroethane | <2.5 ug/L |
| Chloroform | <1.0 ug/L |
| Chloromethane | <2.5 ug/L |
| 2-Chlorotoluene | <2.0 ug/L |
| 4-Chlorotoluene | <2.0 ug/L |
| Dibromochloromethane | <1.0 ug/L |
| 1,2-Dibromo-3-chloropropane | <5.0 ug/L |
| 1,2-Dibromoethane | <2.0 ug/L |
| Dibromomethane | <1.0 ug/L |

STATE OF MISSOURI Mel Carnahan, Governor • David A. Shorr, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P O Box 176 Jefferson City, MO 65102-0176

Page 2
Sample no. 94-C601
Date 5/13/94

| PARAMETERS | RESULTS |
|---|---|
| 1,2-Dichlorobenzene | <0.5 ug/L |
| 1,3-Dichlorobenzene | <1.0 ug/L |
| 1,4-Dichlorobenzene | <0.5 ug/L |
| Dichlorodifluoromethane | <2.5 ug/L |
| 1,1-Dichloroethane | <1.0 ug/L |
| 1,2-Dichloroethane | <0.5 ug/L |
| 1,1-Dichloroethene | <0.5 ug/L |
| cis-1,2-Dichloroethene | <0.5 ug/L |
| trans-1,2-Dichloroethene | <0.5 ug/L |
| 1,2-Dichloropropane | <0.5 ug/L |
| 1,3-Dichloropropane | <2.0 ug/L |
| 2,2-Dichloropropane | <1.0 ug/L |
| 1,1-Dichloropropene | <1.0 ug/L |
| cis-1,3-Dichloropropene | <2.0 ug/L |
| trans-1,3-Dichloropropene | <1.0 ug/L |
| Ethylbenzene | <0.5 ug/L |
| Hexachlorobutadiene | <1.0 ug/L |
| Isopropylbenzene | <2.0 ug/L |
| p-Isopropyltoluene | <2.0 ug/L |
| Methylene Chloride | <0.5 ug/L |
| Naphthalene | <2.0 ug/L |
| n-Propylbenzene | <2.0 ug/L |
| Styrene | <0.5 ug/L |
| 1,1,1,2-Tetrachloroethane | <1.0 ug/L |
| 1,1,2,2-Tetrachloroethane | <1.0 ug/L |
| Tetrachloroethene | <0.5 ug/L |
| Toluene | <0.5 ug/L |
| 1,2,3-Trichlorobenzene | <2.0 ug/L |
| 1,2,4-Trichlorobenzene | <0.5 ug/L |
| 1,1,1-Trichloroethane | <0.5 ug/L |

STATE OF MISSOURI

Mel Carnahan, Governor • David A. Shorr, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O Box 176 Jefferson City, MO 65102-0176

Page 3
Sample no. 94-C601
Date 5/13/94

| PARAMETERS | RESULTS |
|---|---|
| 1,1,2-Trichloroethane | <0.5 ug/L |
| Trichloroethene | <0.5 ug/L |
| Trichlorofluoromethane | <2.5 ug/L |
| 1,2,3-Trichloropropane | <1.0 ug/L |
| 1,2,4-Trimethylbenzene | <1.0 ug/L |
| 1,3,5-Trimethylbenzene | <2.0 ug/L |
| Vinyl Chloride | <0.5 ug/L |
| o-Xylene | <0.5 ug/L |
| m&p-xylene | <0.5 ug/L |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

BOB MARSHALL
CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 97-A760

Sample Number: 97-A468

## RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 24, 1997
Date Collected: January 29, 1997
Sample Location: RODEO WELL HOUSE
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | 3.9 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Report Date: February 24, 1997

Lab Number: 97-A760
Sample Number: 97-A468

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chlorobenz | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 2.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

STATE OF MISSOURI Mel Carnahan Governor • David A. Shorr Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P O Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Sample Number: 97-0487
Lab Number: 97-A2243

| | | | |
|---|---|---|---|
| Reported To: | JIM HOULIHAN | Report Date: | 3/17/97 |
| Affiliation: | JCRO | Date Collected: | 3/12/97 |
| Project Code: | 3404/3000 | Date Received: | 3/12/97 |

Sample Collected by: JIM HOULIHAN, JCRO
PWS Supply Name: CAMDENTON
PWS Identification: MO3010130
PWS County: CAMDEN
Sampling Location: RODEO WELL
Sample Description: CONFIRMATION SAMPLE

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |

Report Date: March 17, 1997

Lab Number: 97-A2243
Sample Number: 97-0487

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chlorobenz | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 2.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: TERRY TIMMONS, PDWP

RECEIVED

FEB 23 1998

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF NATURAL RESOURCES

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A897

Sample Number: 98-B384

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: February 10, 1998
Date Collected: February 2, 1998 PWS ID: MO3010130
Sample Location: RODEO WELL, SPECIAL REQUEST
PWS Name: CAMDENTON

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Report Date: February 10, 1998

Lab Number: 98-A897
Sample Number: 98-B384

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED
1998
MISSOURI DEPARTMENT OF NATURAL RESOURCES

RECEIVED

NOV 02 1998

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A4983

Sample Number: 98-F441

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: May 7, 1998
Date Collected: April 23, 1998
Sample Location: RODEO WELL
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Report Date: May 7, 1998

Lab Number: 98-A4983
Sample Number: 98-F441

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P O Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6301

Sample Number: 98-H071

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 8, 1998
Date Collected: May 21, 1998
Sample Location: RODEO WELL
PWS Name: CAMDENTON

PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |

Page: 2
Report Date: June 8, 1998

Lab Number: 98-A6301
Sample Number: 98-H071

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level    -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

NOV 0 2 1998

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P O Box 176 Jefferson City MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE, CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A6821

Sample Number: 98-F520

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: June 15, 1998
Date Collected: June 8, 1998
Sample Location: RODEO WELL
PWS Name: CAMDENTON

PWS County: CAMDEN
PWS ID: MO3010130

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 20.0 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 0.5 | 1000 | ug/L |
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |

Report Date: June 15, 1998

Lab Number: 98-A6821
Sample Number: 98-F520

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

RECEIVED

NOV 0 3 1998

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

PO Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

VINCENT COSTA
112 COURT CIRCLE - CITY HALL
P.O. BOX 1048
CAMDENTON, MO 65020

Lab Number: 98-A14823

Sample Number: 98-U835

*** QUARTERLY MONITORING ***

RESULTS OF SAMPLE ANALYSES FOR PUBLIC WATER SUPPLIES

Report Date: September 9, 1998
Date Collected: August 25, 1998
PWS ID: MO3010130
Sample Location: RODEO WELL
PWS Name: CAMDENTON

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| VOC Results: | | | |
| Dichlorodifluoromethane | < 200 | -- | ug/L |
| Chloromethane | < 2.5 | -- | ug/L |
| Vinyl Chloride | < 0.5 | 2.0 | ug/L |
| Bromomethane | < 9.0 | -- | ug/L |
| Chloroethane | < 2.5 | -- | ug/L |
| Trichlorofluoromethane | < 2.5 | -- | ug/L |
| 1,1-Dichloroethene | < 0.5 | 7.0 | ug/L |
| Methylene Chloride | < 0.5 | 5.0 | ug/L |
| Methyl-tert-butyl ether | < 5.0 | -- | ug/L |
| trans-1,2-Dichloroethene | < 0.5 | 100 | ug/L |
| 1,1-Dichloroethane | < 1.0 | -- | ug/L |
| 2,2-Dichloropropane | < 1.0 | -- | ug/L |
| cis-1,2-Dichloroethene | < 0.5 | 70.0 | ug/L |
| Chloroform | < 0.5 | -- | ug/L |
| Bromochloromethane | < 1.0 | -- | ug/L |
| 1,1,1-Trichloroethane | < 0.5 | 200 | ug/L |
| 1,1-Dichloropropene | < 1.0 | -- | ug/L |
| Carbon Tetrachloride | < 0.5 | 5.0 | ug/L |
| Benzene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloroethane | < 0.5 | 5.0 | ug/L |
| Trichloroethene | < 0.5 | 5.0 | ug/L |
| 1,2-Dichloropropane | < 0.5 | 5.0 | ug/L |
| Bromodichloromethane | < 0.5 | -- | ug/L |
| Dibromomethane | < 1.0 | -- | ug/L |
| cis-1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Toluene | < 1.0 | 1000 | ug/L |

Report Date: September 9, 1998

Lab Number: 98-A14823
Sample Number: 98-U835

| Analysis Performed | Results | MCL | Units |
|---|---|---|---|
| trans-1,3-Dichloropropane | < 1.0 | -- | ug/L |
| 1,1,2-Trichloroethane | < 0.5 | 5.0 | ug/L |
| Tetrachloroethene | < 0.5 | 5.0 | ug/L |
| 1,3-Dichloropropane | < 2.0 | -- | ug/L |
| Dibromochloromethane | < 0.5 | -- | ug/L |
| 1,2-Dibromoethane | < 2.0 | -- | ug/L |
| Chlorobenzene | < 0.5 | 100 | ug/L |
| Ethylbenzene | < 0.5 | 700 | ug/L |
| 1,1,1,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| Total Xylenes | < 0.5 | 10000 | ug/L |
| Styrene | < 0.5 | 100 | ug/L |
| Isopropylbenzene | < 2.0 | -- | ug/L |
| Bromoform | < 0.5 | -- | ug/L |
| 1,1,2,2-Tetrachloroethane | < 1.0 | -- | ug/L |
| 1,2,3-Trichloropropane | < 1.0 | -- | ug/l |
| n-Propylbenzene | < 2.0 | -- | ug/L |
| Bromobenzene | < 1.0 | -- | ug/L |
| 2-Chlorotoluene | < 2.0 | -- | ug/L |
| 4-Chlorotoluene | < 2.0 | -- | ug/L |
| 1,3,5-Trimethylbenzene | < 2.0 | -- | ug/L |
| tert-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2,4-Trimethylbenzene | < 1.0 | -- | ug/L |
| sec-Butylbenzene | < 2.0 | -- | ug/L |
| p-isopropyltoluene | < 2.0 | -- | ug/L |
| 1,3-Dichlorobenzene | < 1.0 | -- | ug/L |
| 1,4-Dichlorobenzene | < 0.5 | 75.0 | ug/L |
| n-Butylbenzene | < 2.0 | -- | ug/L |
| 1,2-Dichlorobenzene | < 0.5 | 600 | ug/L |
| 1,2-Dibromo-3-Chloroprop | < 5.0 | -- | ug/L |
| 1,2,4-Trichlorobenzene | < 0.5 | 70.0 | ug/L |
| Hexachlorobutadiene | < 1.0 | -- | ug/L |
| Naphthalene | < 20.0 | -- | ug/L |
| 1,2,3-Trichlorobenzene | < 2.0 | -- | ug/L |

MCL = Maximum Contaminant Level -- = Not Applicable

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency. If you have any questions, please contact Mr. Terry Timmons at 573/751-1188.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

Former Hulett Lagoon Site
Combined PA/SI
Reference 51

1998

# ...nt under DNR gun

By Joyce L. Miller

CAMDENTON - A Camdenton manufacturing plant is under the the gun to comply with an order from the Missouri Department of Natural Resources after being identified as a potential source of chemical contamination in the city's water supply.

DNR says Camdenton's water continues to show traces of contamination from an industrial-type cleaning chemical known as trichlethylene. So far, levels of TCE have stayed below those considered acceptable by federal and state standards.

DNR has ordered Modine Manufacturing Company to come up with a plan to address any contamination at the facility that may pose a threat to people or the environment. Modine has 30 days to comply. Failure to do so could force DNR to take legal action against the company.

Modine engineer Bob King said the DNR order was forwarded to corporation headquarters in Racine, Wisconsin.

According to King, the order was vague and didn't contain

(Continued on page 4, col. 1)

# DNR

(Continued from page 1)

any specific course of action.

DNR says the order will establish a regulatory time frame and schedule for the manufacturing plant to follow, in order to deal with potential contamination at the plant's location on Sunset Drive. The plan will be negotiated between DNR and Modine.

DNR and city officials believe the chemical was probably spilled more than a decade ago by Modine's predecessor. The plant is located across from the Mulberry Street well which, up until now, has supplied most of the city's water.

Modine contends the chemical has never been used in the manufacturing process at the Camdenton plant.

Increased levels of TCE have been showing up in the city's water system over the last year. Traces started appearing as early as last summer. Since that time, city officials have determined the contamination was entering the water supply at the Mulberry Street well.

The city is in the process of putting together a deal for a new well on Hickory Street. The well, property and engineering is expected to run the city about $250,000. In the meantime, the Mulberry Street well is being used as little as possible, according to Public Works Director Vince Costa.

TCE is considered to be a human carcinogen by the International Agency for Research on cancer and the Environmental Protection Agency, depending on levels of exposure, duration and amounts.

DNR engineer Chris Kump said the consent order is the first step in the process of determining the nature and extent of the TCE contamination. Based on what is found, clean-up measures may be recommended.

"The order requires Modine to determine the nature and extent of contamination, including groundwater, resulting from past waste handling practices at the facility." DNR spokesman Connie Patterson said "The order also requires Modine to perform a corrective measure study and detail a final remedy to be applied at the

TCE is considered to be a human carcinogen by the International Agency for Research on cancer and the Environmental Protection Agency, depending on levels of exposure, duration and amounts.

site. The public will be asked for review and comment on the proposed final remedy prior to approval by DNR and implementation by Modine."

Modine Manufacturing Company has operated the Camdenton facility since October, 1990. Modine manufactures air-conditioning coils and feeder parts from aluminum and copper tubing. The facility was previously owned by Sunstrand Tubular Products from 1974 to 1990.

Kump said Modine has been very willing to work with DNR to get the TCE problem corrected.

Former Hulett Lagoon Site
Combined PA/SI
Reference 52

R



# RCRA Sampling Investigation Report

## Modine Site - Burnau Private Well
## Camdenton, Missouri

## April 23, 1998

Prepared For:

Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

Prepared By:

Missouri Department of Natural Resources
Division of Environmental Quality
Environmental Services Program

# Table of Contents

## 1.0 Introduction

At the request of the Hazardous Waste Program (HWP) a sampling investigation was conducted on April 23, 1998, by Eric Sappington of the Environmental Services Program (ESP). The purpose of the investigation was to collect a water sample from a private well located at the Dave Burnau residence, 178 Sunset Drive in Camdenton, Missouri. The Burnau home is located across the street from the Modine Heat Transfer, Inc. facility. Information obtained from previous investigations raised concerns that organic solvent contaminants, known to exist in the soils and groundwater at the Modine site, may have migrated to the nearby Burnau well.

The private well at the Burnau residence is a secondary water source, the primary drinking water source being the Camdenton public water supply. There were no samples collected from the Camdenton public water supply during this investigation.

## 2.0 Site Description and History

### 2.1 Site Location

The Burnau residence is located at 178 Sunset Drive, Camdenton, Missouri. The Modine Heat Transfer, Inc. facility is located at 179 Sunset Drive, directly across the street from the Burnau residence.

### 2.2 Site Description

The Burnau home is located in a residential neighborhood adajcent to the Modine facility.

### 2.3 Site History/Contaminants of Concern

Previous investigations conducted at the Modine site found evidence of organic solvent contamination in both soils and groundwater in the vicinity of the manufacturing plant. Trichloroethylene (trichloroethene), tetrachloroethylene, 1,1,1-trichloroethane, and vinyl chloride are among the contaminants that have been detected in the soils and/or groundwater at the site.

Further historical or background information regarding the Modine site can be found in the ESP and HWP files.

## 3.0 Methods

### 3.1 Field Procedures

Sample 98-4702 was collected from an outside spigot located at the rear of the Burnau residence. Sample 98-4703 was collected from the same location as a duplicate to 98-4702. Prior to sample collection, the spigot was turned on and allowed to flow for 12 minutes in order to purge the stagnant water from the pressure tank. According to Mr. Burnau, the pressure tank has a capacity of 30 to 40 gallons. Using a stop watch and a graduated bucket, the flow rate was calculated at four gallons per minute. Thus, 48 gallons were purged prior to sample collection. The water was discharged into a storm drain on the Burnau property.

In order to minimize agitation and aeration at the spigot, the flow rate was reduced to a thin stream for sample collection. The vials for volatile organic parameters were filled first, then the flow rate was increased slightly to facilitate filling the one-liter sample containers for semi-volatile organic parameters.

The sample vials for the volatile organic parameters were pre-preserved with a few drops of hydrochloric acid. The containers for semi-volatile organic parameters required no chemical preservatives. Upon collection, all sample containers were labelled and placed immediately on ice in a cooler.

Clean nitrile gloves were worn for sample collection.

Modine was contacted prior to the investigation and offered the opportunity to collect split samples from the Burnau well. The company was initially interested in collecting samples, but then declined the offer.

### 3.2 Chain-of-Custody

Each sample container received a numbered label upon collection. A chain-of-custody form was then completed which recorded the sample number assigned to each container, the description of the location of the sample collected, the date and time collected, and the parameters to be analyzed.

The ESP representative maintained custody of the samples and hand delivered the samples to the Environmental Services Program in Jefferson City where they were relinquished to a sample custodian.

### 3.3 Analyses Requested

All samples were analyzed for volatile organic and semi-volatile organic parameters.

### 3.4 Quality Assurance/Quality Control (QA/QC)

All samples were analyzed in accordance with the general requirements and standard operating procedures described in the Fiscal Year 1998 Generator/TSD Quality Assurance Project Plan.

Sample 98-4701 was collected as a trip blank and analyzed for the same parameters as the groundwater samples.

## 4.0 Investigation Derived Wastes

All disposable personal protective equipment generated by the ESP representative was returned to the ESP laboratory for proper disposal.

## 5.0 Observations

The samples collected from the Burnau private well were clear, colorless and had no discernable odor.

When asked at the time of the investigation, Mr. Burnau was not aware of the well characteristics (e.g. total well depth, static water level, casing depth, or depth of pump). The ESP did not open up the well and made no attempt to measure the well characteristics.

Mr. Burnau stated that he used the private well primarily for watering his lawn and that he did not use the well as a source of drinking water. There was nothing unusual noted regarding the lawn and there were no obvious signs of stressed vegetation observed.

The weather on the day of sampling was sunny and warm.

## 6.0 Data Reporting

The analytical results of the sampling investigation are attached to this report.

In response to a request made by Mr. Burnau at the time of the investigation, Eric Sappington provided the sample results to Mr. Burnau during a telephone conversation that took place on May 18, 1998. Mr. Burnau was informed that the level of trichloroethene (TCE) in his private well exceeded the Maximum Contaminant Level (MCL) for public drinking water supplies. The MCL for TCE is 5 parts per billion (ug/L). Mr. Burnau was advised not to drink the water and was provided with a contact at the Missouri Department of Health (Randy Maley) should he have any questions regarding the health effects of TCE.

Submitted by: Eric Sappington
Eric Sappington
Environmental Specialist
Field Services Section
Environmental Services Program

Date: 5/20/98

Approved by: James H. Long
James H. Long
Director
Environmental Services Program

ES:

c: Chris Kump, HWP
Bob Hentges, Regional Director, JCRO

Appendix A

RCRA Sampling Investigation Report
Modine Site - Burnau Private Well
Camdenton, Missouri
April 23, 1998

Analytical Results

STATE OF MISSOURI

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

## RESULTS OF SAMPLE ANALYSES

Sample Number: 98-4701
Lab Number: 98-D933

| | | | |
|---|---|---|---|
| Reported To: | ERIC SAPPINGTON | Report Date: | 5/ 6/98 |
| Affiliation: | ESP | Date Collected: | 4/23/98 |
| Project Code: | 3735/3000 | Date Received: | 4/24/98 |

Sample Collected by: ERIC SAPPINGTON, ESP
Sampling Location: MODINE SITE, CAMDENTON, MO,
Sample Description: TRIP BLANKS

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| VOA Results: | | | | |
| Chloromethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Vinyl Chloride | < 5.0 | ug/L | 4/28/98 | 8260 |
| Bromomethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Chloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,1-Dichloroethene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Acetone | < 20.0 | ug/L | 4/28/98 | 8260 |
| Carbon Disulfide | < 5.0 | ug/L | 4/28/98 | 8260 |
| Methylene Chloride | < 20.0 | ug/L | 4/28/98 | 8260 |
| Methyl Tert-Butyl Ether | < 5.0 | ug/L | 4/28/98 | 8260 |
| trans-1,2-Dichloroethene | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,1-Dichloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| 2-Butanone | < 20.0 | ug/L | 4/28/98 | 8260 |
| cis-1,2-Dichloroethene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Chloroform | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,1,1-Trichloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Carbon Tetrachloride | < 5.0 | ug/L | 4/28/98 | 8260 |
| Benzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,2-Dichloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Trichloroethene | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,2-Dichloropropane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Bromodichloromethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| 2-Hexanone | < 20.0 | ug/L | 4/28/98 | 8260 |
| Trans-1,3-Dichloropropene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Toluene | < 5.0 | ug/L | 4/28/98 | 8260 |
| CIS-1,3-Dichloropropene | < 5.0 | ug/L | 4/28/98 | 8260 |

Page 2
Lab Number: 98-D933
Sample Number: 98-4701
May 6, 1998

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| 4-Methyl-2-Pentanone | < 20.0 | ug/L | 4/28/98 | 8260 |
| Tetrachloroethene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Dibromochloromethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Chlorobenzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Ethylbenzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Total Xylenes | < 5.0 | ug/L | 4/28/98 | 8260 |
| Styrene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Bromoform | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,3-Dichlorobenzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,4-Dichlorobenzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,2-Dichlorobenzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| BNA Results: | | | | |
| Phenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(-2-Chloroethyl)Ether | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Chlorophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 1,3-Dichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 1,4-Dichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| N-nitrosodimethylamine | < 2.0 | ug/L | 4/30/98 | 8270 |
| 1,2-Dichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Methylphenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(2-Chloroisopropyl)Eth | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Methylphenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| N-Nitro-Di-n-Propylamine | < 2.0 | ug/L | 4/30/98 | 8270 |
| Hexachloroethane | < 2.0 | ug/L | 4/30/98 | 8270 |
| Nitrobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Isophorone | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Nitrophenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dimethylphenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzoic Acid | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(2-Chloroethoxy)Methan | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dichlorophenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| 1,2,4-Trichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Naphthalene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Chloroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| Hexachlorobutadiene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Chloro-3-Methylphenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 2-Methylnaphthalene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Hexachlorocyclopentadiene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4,6-Trichlorophenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4,5-Trichlorophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 2-Chloronaphthalene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Nitroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| Dimethylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| Acenaphthylene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,6-Dinitrotoluene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 3-Nitroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |

Page 3
Lab Number: 98-D933
Sample Number: 98-4701
May 6, 1998

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| Acenaphthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dinitrophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 4-Nitrophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| Dibenzofuran | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dinitrotoluene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Diethylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Chlorophenyl-phenylethe | < 2.0 | ug/L | 4/30/98 | 8270 |
| Fluorene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Nitroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| 4,6-Dinitro-2-Methylpheno | < 5.0 | ug/L | 4/30/98 | 8270 |
| N-Nitrosodiphenylamine | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Bromophenyl-phenylether | < 2.0 | ug/L | 4/30/98 | 8270 |
| Hexachlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Pentachlorophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| Phenanthrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Anthrancene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Di-n-Butylphthalate | < 5.0 | ug/L | 4/30/98 | 8270 |
| Fluoranthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Pyrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Butylbenzylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| 3-3'-Dichlorobenzidine | < 5.0 | ug/L | 4/30/98 | 8270 |
| Benzo(a)anthracene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Chrysene | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(2-ethylhexyl)phthalat | < 5.0 | ug/L | 4/30/98 | 8270 |
| Di-n-Octylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(b)fluoranthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(k)fluoranthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(a)pyrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Indeno(1,2,3-cd)pyrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Dibenz(a,h)anthracene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(g,h,i)perylene | < 2.0 | ug/L | 4/30/98 | 8270 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI    Mel Carnahan Governor • Stephen M. Mahfood Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P O Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

## RESULTS OF SAMPLE ANALYSES

Sample Number: 98-4702
Lab Number: 98-D935

Reported To: ERIC SAPPINGTON
Affiliation: ESP
Project Code: 3735/3000

Report Date: 5/ 6/98
Date Collected: 4/23/98
Date Received: 4/24/98

Sample Collected by: ERIC SAPPINGTON, ESP
Sampling Location: MODINE SITE, CAMDENTON, MO,
Sample Description: BURNAU RESIDENCE, GROUNDWATER, PRIVATE WELL

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| VOA Results: | | | | |
| Chloromethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Vinyl Chloride | < 5.0 | ug/L | 4/28/98 | 8260 |
| Bromomethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Chloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,1-Dichloroethene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Acetone | < 20.0 | ug/L | 4/28/98 | 8260 |
| Carbon Disulfide | < 5.0 | ug/L | 4/28/98 | 8260 |
| Methylene Chloride | < 20.0 | ug/L | 4/28/98 | 8260 |
| Methyl Tert-Butyl Ether | < 5.0 | ug/L | 4/28/98 | 8260 |
| trans-1,2-Dichloroethene | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,1-Dichloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| 2-Butanone | < 20.0 | ug/L | 4/28/98 | 8260 |
| cis-1,2-Dichloroethene | 12.0 | ug/L | 4/28/98 | 8260 |
| Chloroform | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,1,1-Trichloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Carbon Tetrachloride | < 5.0 | ug/L | 4/28/98 | 8260 |
| Benzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,2-Dichloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Trichloroethene | 210 | ug/L | 4/28/98 | 8260 |
| 1,2-Dichloropropane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Bromodichloromethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| 2-Hexanone | < 20.0 | ug/L | 4/28/98 | 8260 |
| Trans-1,3-Dichloropropene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Toluene | < 5.0 | ug/L | 4/28/98 | 8260 |

Page 2
Lab Number: 98-D935
Sample Number: 98-4702
May 6, 1998

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| CIS-1,3-Dichloropropene | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,1,2-Trichloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| 4-Methyl-2-Pentanone | < 20.0 | ug/L | 4/28/98 | 8260 |
| Tetrachloroethene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Dibromochloromethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| Chlorobenzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Ethylbenzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Total Xylenes | < 5.0 | ug/L | 4/28/98 | 8260 |
| Styrene | < 5.0 | ug/L | 4/28/98 | 8260 |
| Bromoform | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,3-Dichlorobenzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,4-Dichlorobenzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| 1,2-Dichlorobenzene | < 5.0 | ug/L | 4/28/98 | 8260 |
| BNA Results: | | | | |
| Phenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(-2-Chloroethyl)Ether | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Chlorophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 1,3-Dichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 1,4-Dichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| N-nitrosodimethylamine | < 2.0 | ug/L | 4/30/98 | 8270 |
| 1,2-Dichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Methylphenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(2-Chloroisopropyl)Eth | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Methylphenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| N-Nitro-Di-n-Propylamine | < 2.0 | ug/L | 4/30/98 | 8270 |
| Hexachloroethane | < 2.0 | ug/L | 4/30/98 | 8270 |
| Nitrobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Isophorone | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Nitrophenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dimethylphenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzoic Acid | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(2-Chloroethoxy)Methan | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dichlorophenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| 1,2,4-Trichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Naphthalene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Chloroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| Hexachlorobutadiene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Chloro-3-Methylphenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 2-Methylnaphthalene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Hexachlorocyclopentadiene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4,6-Trichlorophenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4,5-Trichlorophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 2-Chloronaphthalene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Nitroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| Dimethylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| Acenaphthylene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,6-Dinitrotoluene | < 2.0 | ug/L | 4/30/98 | 8270 |

Lab Number: 98-D935
Sample Number: 98-4702
May 6, 1998

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| 3-Nitroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| Acenaphthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dinitrophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 4-Nitrophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| Dibenzofuran | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dinitrotoluene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Diethylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Chlorophenyl-phenylethe | < 2.0 | ug/L | 4/30/98 | 8270 |
| Fluorene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Nitroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| 4,6-Dinitro-2-Methylpheno | < 5.0 | ug/L | 4/30/98 | 8270 |
| N-Nitrosodiphenylamine | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Bromophenyl-phenylether | < 2.0 | ug/L | 4/30/98 | 8270 |
| Hexachlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Pentachlorophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| Phenanthrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Anthrancene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Di-n-Butylphthalate | < 5.0 | ug/L | 4/30/98 | 8270 |
| Fluoranthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Pyrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Butylbenzylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| 3-3'-Dichlorobenzidine | < 5.0 | ug/L | 4/30/98 | 8270 |
| Benzo(a)anthracene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Chrysene | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(2-ethylhexyl)phthalat | < 5.0 | ug/L | 4/30/98 | 8270 |
| Di-n-Octylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(b)fluoranthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(k)fluoranthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(a)pyrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Indeno(1,2,3-cd)pyrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Dibenz(a,h)anthracene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(g,h,i)perylene | < 2.0 | ug/L | 4/30/98 | 8270 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI Mel Carnahan Governor • Stephen M. Mahfood Director

# DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

## ENVIRONMENTAL SERVICES PROGRAM

## RESULTS OF SAMPLE ANALYSES

Sample Number: 98-4703
Lab Number: 98-D936

| | | | |
|---|---|---|---|
| Reported To: | ERIC SAPPINGTON | Report Date: | 5/13/98 |
| Affiliation: | ESP | Date Collected: | 4/23/98 |
| Project Code: | 3735/3000 | Date Received: | 4/24/98 |

Sample Collected by: ERIC SAPPINGTON, ESP
Sampling Location: MODINE SITE, CAMDENTON, MO,
Sample Description: BURNAU RESIDENCE, GROUNDWATER, PRIVATE WELL (DUPLICATE)

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| VOA Results: | | | | |
| Chloromethane | < 5.0 | ug/L | 4/29/98 | 8260 |
| Vinyl Chloride | < 5.0 | ug/L | 4/29/98 | 8260 |
| Bromomethane | < 5.0 | ug/L | 4/29/98 | 8260 |
| Chloroethane | < 5.0 | ug/L | 4/29/98 | 8260 |
| 1,1-Dichloroethene | < 5.0 | ug/L | 4/29/98 | 8260 |
| Acetone | < 20.0 | ug/L | 4/29/98 | 8260 |
| Carbon Disulfide | < 5.0 | ug/L | 4/29/98 | 8260 |
| Methylene Chloride | < 20.0 | ug/L | 4/29/98 | 8260 |
| Methyl Tert-Butyl Ether | < 5.0 | ug/L | 4/29/98 | 8260 |
| trans-1,2-Dichloroethene | < 5.0 | ug/L | 4/29/98 | 8260 |
| 1,1-Dichloroethane | < 5.0 | ug/L | 4/29/98 | 8260 |
| 2-Butanone | < 20.0 | ug/L | 4/29/98 | 8260 |
| cis-1,2-Dichloroethene | 13.0 | ug/L | 4/29/98 | 8260 |
| Chloroform | < 5.0 | ug/L | 4/29/98 | 8260 |
| 1,1,1-Trichloroethane | < 5.0 | ug/L | 4/29/98 | 8260 |
| Carbon Tetrachloride | < 5.0 | ug/L | 4/29/98 | 8260 |
| Benzene | < 5.0 | ug/L | 4/29/98 | 8260 |
| 1,2-Dichloroethane | < 5.0 | ug/L | 4/29/98 | 8260 |
| Trichloroethene | 170 | ug/L | 4/29/98 | 8260 |
| 1,2-Dichloropropane | < 5.0 | ug/L | 4/29/98 | 8260 |
| Bromodichloromethane | < 5.0 | ug/L | 4/29/98 | 8260 |
| 2-Hexanone | < 20.0 | ug/L | 4/29/98 | 8260 |
| Trans-1,3-Dichloropropene | < 5.0 | ug/L | 4/29/98 | 8260 |
| Toluene | < 5.0 | ug/L | 4/29/98 | 8260 |

Lab Number: 98-D936
Sample Number: 98-4703
May 13, 1998

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| CIS-1,3-Dichloropropene | < 5.0 | ug/L | 4/29/98 | 8260 |
| 1,1,2-Trichloroethane | < 5.0 | ug/L | 4/29/98 | 8260 |
| 4-Methyl-2-Pentanone | < 20.0 | ug/L | 4/29/98 | 8260 |
| Tetrachloroethene | < 5.0 | ug/L | 4/29/98 | 8260 |
| Dibromochloromethane | < 5.0 | ug/L | 4/29/98 | 8260 |
| Chlorobenzene | < 5.0 | ug/L | 4/29/98 | 8260 |
| Ethylbenzene | < 5.0 | ug/L | 4/29/98 | 8260 |
| Total Xylenes | < 5.0 | ug/L | 4/29/98 | 8260 |
| Styrene | < 5.0 | ug/L | 4/29/98 | 8260 |
| Bromoform | < 5.0 | ug/L | 4/29/98 | 8260 |
| 1,1,2,2-Tetrachloroethane | < 5.0 | ug/L | 4/29/98 | 8260 |
| 1,3-Dichlorobenzene | < 5.0 | ug/L | 4/29/98 | 8260 |
| 1,4-Dichlorobenzene | < 5.0 | ug/L | 4/29/98 | 8260 |
| 1,2-Dichlorobenzene | < 5.0 | ug/L | 4/29/98 | 8260 |
| BNA Results: | | | | |
| Phenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(-2-Chloroethyl)Ether | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Chlorophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 1,3-Dichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 1,4-Dichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| N-nitrosodimethylamine | < 2.0 | ug/L | 4/30/98 | 8270 |
| 1,2-Dichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Methylphenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(2-Chloroisopropyl)Eth | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Methylphenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| N-Nitro-Di-n-Propylamine | < 2.0 | ug/L | 4/30/98 | 8270 |
| Hexachloroethane | < 2.0 | ug/L | 4/30/98 | 8270 |
| Nitrobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Isophorone | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Nitrophenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dimethylphenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzoic Acid | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(2-Chloroethoxy)Methan | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dichlorophenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| 1,2,4-Trichlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Naphthalene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Chloroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| Hexachlorobutadiene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Chloro-3-Methylphenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 2-Methylnaphthalene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Hexachlorocyclopentadiene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4,6-Trichlorophenol | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4,5-Trichlorophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 2-Chloronaphthalene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2-Nitroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| Dimethylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| Acenaphthylene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,6-Dinitrotoluene | < 2.0 | ug/L | 4/30/98 | 8270 |

Lab Number: 98-D936
Sample Number: 98-4703
May 13, 1998

| Analysis Performed | Results | | Analyzed | Method |
|---|---|---|---|---|
| 3-Nitroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| Acenaphthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dinitrophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| 4-Nitrophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| Dibenzofuran | < 2.0 | ug/L | 4/30/98 | 8270 |
| 2,4-Dinitrotoluene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Diethylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Chlorophenyl-phenylethe | < 2.0 | ug/L | 4/30/98 | 8270 |
| Fluorene | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Nitroaniline | < 5.0 | ug/L | 4/30/98 | 8270 |
| 4,6-Dinitro-2-Methylpheno | < 5.0 | ug/L | 4/30/98 | 8270 |
| N-Nitrosodiphenylamine | < 2.0 | ug/L | 4/30/98 | 8270 |
| 4-Bromophenyl-phenylether | < 2.0 | ug/L | 4/30/98 | 8270 |
| Hexachlorobenzene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Pentachlorophenol | < 5.0 | ug/L | 4/30/98 | 8270 |
| Phenanthrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Anthrancene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Di-n-Butylphthalate | < 5.0 | ug/L | 4/30/98 | 8270 |
| Fluoranthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Pyrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Butylbenzylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| 3-3'-Dichlorobenzidine | < 5.0 | ug/L | 4/30/98 | 8270 |
| Benzo(a)anthracene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Chrysene | < 2.0 | ug/L | 4/30/98 | 8270 |
| bis(2-ethylhexyl)phthalat | < 5.0 | ug/L | 4/30/98 | 8270 |
| Di-n-Octylphthalate | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(b)fluoranthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(k)fluoranthene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(a)pyrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Indeno(1,2,3-cd)pyrene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Dibenz(a,h)anthracene | < 2.0 | ug/L | 4/30/98 | 8270 |
| Benzo(g,h,i)perylene | < 2.0 | ug/L | 4/30/98 | 8270 |

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas W. Edwards for

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

Former Hulett Lagoon Site
Combined PA/SI
Reference 53

JOHN ASHCROFT
Governor

Acting Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGY AND LAND SURVEY
P.O Box 250 111 Fairgrounds Rd. Rolla, MO 65401

**MONITORING WELL INSTALLATION FOR SUNDSTRAND PA/SI**

On July 22-29, 1992, two monitoring wells were drilled at the Sundstrand site in Camdenton. This site is located in Section 26, T. 38 N., R. 17 W., in Camden County. These two wells are an upgradient well and a downgradient well for the site. Both monitor the water table which was encountered at depths of 160 to 175 feet. The locations of these wells are indicated on an attached map.

In the downgradient well, bedrock was encountered at a much greater depth than anticipated, and nominal 8 inch steel surfacing casing was installed to a depth of 94 feet. This casing was grouted full length with a 2% CaCl cement. No surface casing was used in the upgradient well. Both wells are completed in the Gasconade Dolomite.

In both wells schedule 80 PVC screen with a size 10 slot, 12-20 sand, and 2" schedule 40 PVC riser pipe was used.

Edith Starbuck, Geologist
Environmental Geology Section
Geology & Land Survey
August 7, 1992

ES/dsb

| Post-It® Fax Note 7671 | Date 11-9-94 # of pages ▶ 4 |
|---|---|
| To Jim Tucholski | From Edie Starbuck |
| Co./Dept. H.W.P. - DEQ | Co. DGLS - Rolla |
| Phone # 314-751-2674 | Phone # 314-368-2136 |
| Fax # 314-751-7869 | Fax # 314-368-2111 |

MW-2

# GEOLOGIC DRILL LOG

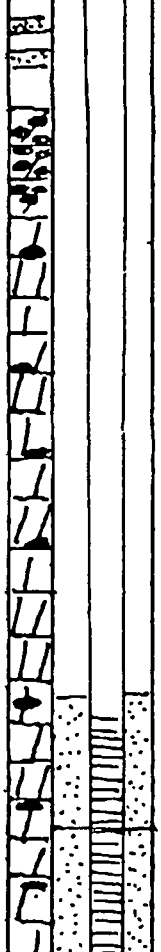
| PROJECT NAME AND LOCATION | PAGE NO. | HOLE NO. |
|---|---|---|
| Sundstrand PA/SI, Camdenton | of | MW-2 |

| START | FINISH | DRILLER | DRILL METHOD | BOREHOLE DIAMETER | WELL DIAMETER | TOTAL DEPTH |
|---|---|---|---|---|---|---|
| 7/28 | 7/29 | Layne | air rotary | 8 ¼" | 2" | 19– |

| LOGGER | TOP of CASING ELEV. | GROUND ELEVATION | DEPTH/ELEVATION GROUNDWATER - DATE MEASURED |
|---|---|---|---|
| Starbuck | | approx. ~~850~~ 990 | 176, 7/29/92 (possibly not fully recharged) |

upgradient - inside fenced area, east of building

| SAMPLE NO. | SAMPLE TYPE | RECOVERY * | SAMPLE BLOWS* | ELEV | DEPTH | GRAPHIC LOG | WELL CONSTRUCTION | CLASS-IFICATION | SAMPLE INTERVAL | DESCRIPTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 12 | | | | | fill material to about 5', thin sandstones in sandy red clay with chert | |
| | | | | | 24' | | | | | much chert. | |
| | | | | | 37' | | | | | medium gray dolomite with chert, often sandy | |
| | | | | | 123 | | | | | | slightly moist cuttings |
| | | | | | 145 | | | | | | |
| | | | | | 157 | | | | | | w.l. 176' |
| | | | | | | | | | | | v. wet @ 196' |
| | | | | | 197 | | | | | | 2' seal, 52' sand, 40' screen |
| | | | | | | | | | | Aug 9 1995 159.53 below T.O.C. | |



*ASTM D1586
SS = SPLIT SPOON C = CORE CS = CONTINUOUS SAMPLER
D = DENNISON CT = CUTTINGS HA = BUCKET AUG.
ST = SHELBY TUBE

PAGE NO. of HOLE NO.

FIGURE 3-1
FIELD DRILL LOG

Not to scale

| GEOLOGIC DRILL LOG | PROJECT NAME AND LOCATION | PAGE NO. | HOLE NO. |
|---|---|---|---|
| | Sundstrand PA/SI, Camdenton | of | |

| START | FINISH | DRILLER | DRILL METHOD | BOREHOLE DIAMETER | WELL DIAMETER | TOTAL DEPTH |
|---|---|---|---|---|---|---|
| 7/28 | 7/29 | Layne | air rotary | 8 ¼" | 2" | 197 |

| LOGGER | TOP of CASING ELEV. | GROUND ELEVATION | DEPTH/ELEVATION GROUNDWATER - DATE MEASURED |
|---|---|---|---|
| Starbuck | | approx. ~~950~~ 940 | 176, 7/29/92 (Possibly not fully recharged |

upgradient - inside fenced area, east of building

| SAMPLE NO. | SAMPLE TYPE | RECOVERY " | SAMPLE BLOWS* | ELEV | DEPTH | GRAPHIC LOG | WELL CONSTRUCTION | CLASS-IFICATION | SAMPLE INTERVAL | DESCRIPTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 12 |  | | | | fill material to about 5', thin sandstones in sandy red clay with chert | |
| | | | | | 24' | | | | | much chert | |
| | | | | | 37' | | | | | medium gray dolomite with chert, often sandy | |
| | | | | | 123 | | | | | | slightly moist cutting |
| | | | | | | | | | | | v. wet @ 196' |
| | | | | | 197 | | | | | | 2' seal, 52' sand, 40' screen |

*ASTM D1586 ST = SHELBY TUBE
SS = SPLIT SPOON C = CORE CS = CONTINUOUS SAMPLER
D = DENNISON CT = CUTTINGS BA = BUCKET AUG.

| PAGE NO. | HOLE NO. |
|---|---|
| of | |

FIGURE 3-1
FIELD DRILL LOG

'Wa-

where cement will be ready

# GEOLOGIC DRILL LOG

PROJECT NAME AND LOCATION: Sundstrand, Camdenton MO

PAGE NO. of

HOLE NO. up

START 7/28 FINISH 7/29 DRILLER DRILL METHOD BOREHOLE DIAMETER WELL DIAMETER TOTAL DEPTH

LOGGER TOP of CASING ELEV. GROUND ELEVATION DEPTH/ELEVATION GROUNDWATER - DATE MEASURED 176 - 7/29/92

schd 40 pipe, schd 80 screen (40') 10 slot 12-20 sand (16 bags)

| SAMPLE NO. | SAMPLE TYPE | RECOVERY * | SAMPLE BLOWS* | ELEV | DEPTH | GRAPHIC LOG | WELL CONSTRUCTION | CLASS-IFICATION | SAMPLE INTERVAL | DESCRIPTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0' | | | | | poor samples - encountering gravel in (fill?) | |
| | | | | | 5' | | | | | " | |
| | | | | | 10-12 | | | | | ~ 18" of dense red clay above 8' of poorly consolidated sand (red stain) fine - frosted - poorly rounded | |
| | | | | | 15'-16' | | | | | sandy clay, ~ 2" sand, broken dk gray chert | |
| | | | | | 20-22 | | | | | somewhat sandy dense red clay w/ 2" sandy dolomite | |
| | | | | | 24' | | | | | lots of chert gray white | |
| | | | | | 30' | | 37' "good bedrock" | | | chert & some dolo - little sandy. | damp |
| | | | | | 40' | | | | | lt gray dolo - some dk gr chert some clayey seams | frequent clay seams |
| | | | | | 50 | | | | | lt gray micro xln dolomite | |
| | | | | | 60 | | | | | " some med gray chert | |
| | | | | | 70 | | | | | " | |
| | | | | | 80 | | | | | lt gray ~~fine~~ xln dolomite | |
| | | | | | 90 | | | | | tan-gray dolomite - little gray chert | |
| | | | | | 100 | | | | | med gray sandy dolomite - little wht chert | |
| | | | | | 110 | | | | | tan gray " " " " | |
| | | | | | 120 | | | | | " | moist |
| | | | | | 123 | | | | | | ~~shell~~ moist |
| | | | | | 127 | | | | | ~~tan~~-gray dolomite w/ little chert | dry |
| | | | | | 132 | | | | | | moisture |
| | | | | | ~~138~~ | | | | | " w/ lots of grey chert | slightly moist |
| | | 145' | | | 143 | | | | | " | " |
| | | | | | 147 | | | | | sandy dolomite | dry |
| | | 157' | | | 152 | | | | | let stand ~ 1 hr - v.v. little water | |
| | | | | | 178 | | | | | buff-colored dolomite | |
| | | | | | 183 | | | | | | little moist |
| | | | | | 185 | | | | | " " w/ some chert | |
| | | | | | 190 | | | | | | v. wet |
| | | | | | 196 | | | | | v. wet - a respectable amount of water | |
| | | | | | 197 | | | | | T.D | |

*ASTM D1586
SS = SPLIT SPOON C = CORE CS = CONTINUOUS SAMPLER
D = DENNISON CT = CUTTINGS BA = BUCKET AUG.
ST = SHELBY TUBE

PAGE NO. of HOLE NO.

Floyd said damp @ ~163'

**FIGURE 3-1 FIELD DRILL LOG**

MW 1

# GEOLOGIC DRILL LOG

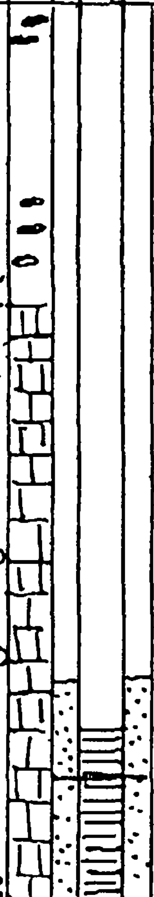
| PROJECT NAME AND LOCATION | PAGE NO. | HOLE NO. |
|---|---|---|
| Sundstrand PA/SI, Camdenton | of | MW-1 |

| START | FINISH | DRILLER | DRILL METHOD | BOREHOLE DIAMETER | WELL DIAMETER | TOTAL DEPTH |
|---|---|---|---|---|---|---|
| 7/22 | 7/27 | Layne | air rotary | 8½" / 12" | 2" | 178 |

| LOGGER | TOP OF CASING ELEV. | GROUND ELEVATION | DEPTH/ELEVATION GROUNDWATER · DATE MEASURED |
|---|---|---|---|
| Starbuck | | approx ~~940~~ 950 | 161 · 7/28/92 |

downgradient - 50' west of west parking lot

| SAMPLE NO. | SAMPLE TYPE | RECOVERY * | SAMPLE BLOWS* | ELEV | DEPTH | GRAPHIC LOG | WELL CONSTRUCTION | CLASS-IFICATION | SAMPLE INTERVAL | DESCRIPTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | silty red clay with chert. the zone from 10-20 had little chert | surface casing to 94 feet |
| | | | | | 25 | | | | | boulders or relict bedding of chert and dolomite | |
| | | | | | 80' | | | | | much chert | |
| | | | | | 90 | | | | | | |
| | | | | | 100 | | | | | sandy dolomite with chert | moist cutting ↓ |
| | | | | | 120 | | | | | medium gray dolomite with very little chert | w.l. 161' |
| | | | | | 178 | | | | | | 2' seal 50' sand 40' screen |



Aug 9 '95 147.28 below T.O.C.

| | | |
|---|---|---|
| *ASTM D1586 SS = SPLIT SPOON D = DENNISON | ST = SHELBY TUBE C = CORE CT = CUTTINGS | CS = CONTINUOUS SAMPLER BA = BUCKET AUG. |

PAGE NO. of HOLE NO.

FIGURE 3-1
FIELD DRILL LOG

Not to scale

# GEOLOGIC DRILL LOG

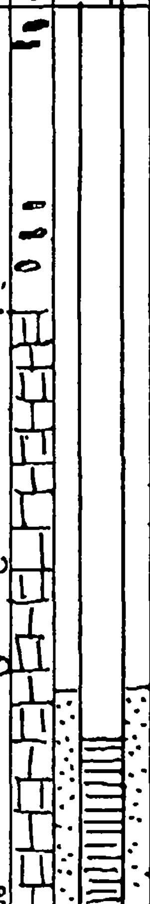
| PROJECT NAME AND LOCATION | PAGE NO. | HOLE NO. |
|---|---|---|
| Sundstrand PA/SI, Camdenton | of | |

| START | FINISH | DRILLER | DRILL METHOD | BOREHOLE DIAMETER | WELL DIAMETER | TOTAL DEPTH |
|---|---|---|---|---|---|---|
| 7/22 | 7/27 | Layne | air rotary | 8½" / 12" | 2" | 179' |

| LOGGER | TOP of CASING ELEV. | GROUND ELEVATION | DEPTH/ELEVATION GROUNDWATER - DATE MEASURED |
|---|---|---|---|
| Starbuck | | approx ~~970~~ 950 | 161 . 7/28/92 |

downgradient - 50' west of west parking lot

| SAMPLE NO. | SAMPLE TYPE | RECOVERY % | SAMPLE BLOWS* | ELEV | DEPTH | GRAPHIC LOG | WELL CONSTRUCTION | CLASS-IFICATION | SAMPLE INTERVAL | DESCRIPTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|



- silty red clay with chert. the zone from 10-20 had little chert — Notes: surface casing to 94 feet
- 25 — boulders or relict bedding of chert and dolomite
- 80' — much chert
- 90
- 100 — sandy dolomite with chert — Notes: moist cuttings ↓
- 120 — medium gray dolomite with very little chert
- 178 — Notes: 2' seal, 50' sand, 40' screen

*ASTM D1586
SS = SPLIT SPOON  ST = SHELBY TUBE  C = CORE  CS = CONTINUOUS SAMPLER
D = DENNISON  CT = CUTTINGS  BA = BUCKET AUG.

PAGE NO. of  HOLE NO.

FIGURE 3-1
FIELD DRILL LOG

# GEOLOGIC DRILL LOG

| PROJECT NAME AND LOCATION | PAGE NO. of | HOLE NO |
|---|---|---|
| | | dow |

| START | FINISH | DRILLER | DRILL METHOD | BOREHOLE DIAMETER | WELL DIAMETER | TOTAL DEPTH |
|---|---|---|---|---|---|---|
| 7/22 | 7/27 | | | | | 178 |

| LOGGER | TOP of CASING ELEV. | GROUND ELEVATION | DEPTH/ELEVATION GROUNDWATER - DATE MEASURED |
|---|---|---|---|
| | | | 161' 7/28 |

50' west and 160' south of NW corner of lot

| SAMPLE NO. | SAMPLE TYPE | RECOVERY * | SAMPLE BLOWS* | ELEV | DEPTH | GRAPHIC LOG | WELL CONSTRUCTION | CLASS-IFICATION | SAMPLE INTERVAL | DESCRIPTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 100 | | | | | | sandy dolomite & chert (lt gray) buff color | * |
| | | | | 110 | | | | | | " " less chert | |
| | | | | 120 | | | | | | med gray dolomite w/ small amt gray chert | |
| | | | | 130 | | | | | | med gray dolomite - no chert | moist |
| | | | | 140 | | | | | | " | |
| | | | | 150 | | | | | | gray dolo - white & gray chert | |
| | | | | 160 | | | | | | " - " | |
| | | | | 170 | | | | | | " " | |
| | | | | 178 | | | | | | | total dep |

7/27/92 WL = 159'
28 WL = 161'

*ASTM D1586
SS = SPLIT SPOON D = DENNISON
ST = SHELBY TUBE C = CORE CT = CUTTINGS
CS = CONTINUOUS SAMPLER BA = BUCKET AUG.

PAGE NO. of | HOLE NO

* Dave said - lots of chert in 80-94'

FIGURE 3-1
FIELD DRILL LOG

0 tan + red silty clay

5' - ns - silty red clay w/ much chert

5+ stiff red clay w/ small chert fragments

10-12' ~~xx~~ v. stiff red clay w gray chert (flint) and sandy dolomite fragments

15-17' " (chert in 3" zone ~ 16½')

20-20.5' - stiff red clay w/ small ~~xx~~ chert fragments

21' - chert

25' - } poor bedding (dolo + chert) no sample

30 "

39' - more rock - tan clay

65' - ~~bedrock~~ rock layer

80' - bedrock

12" hole to 94'

tremie pipe to 85' 2% Ca

> 2/3 of 75 bags

Call Dave

Former Hulett Lagoon Site
Combined PA/SI
Reference 54

# COMPREHENSIVE GROUNDWATER MONITORING EVALUATION
# MODINE MANUFACTURING COMPANY
# CAMDENTON, MISSOURI

**Conducted by**


MISSOURI DEPARTMENT OF NATURAL RESOURCES
HAZARDOUS WASTE PROGRAM
GROUNDWATER UNIT

CHRIS KUMP
ENVIRONMENTAL ENGINEER


JANUARY, 1998

# COMPREHENSIVE MONITORING EVALUATION REPORT

# MODINE MANUFACTURING COMPANY

# CAMDENTON, MISSOURI

Prepared by

**Chris Kump**
**Environmental Engjneer**

**MDNR HAZARDOUS WASTE PROGRAM**

**JANUARY, 1998**

# EXECUTIVE SUMMARY

Modine Manufacturing Company, Camdenton, Missouri produces air-conditioning coils and feeder parts from aluminum and copper tubing. The facility was originally owned and operated by Dawson Metal Products form 1967 to 1974. Sundstrand Tubular products purchased the facility in 1974, and continued operating until 1990. In October 1990 the facility was purchased by Modine Heat Transfer, Inc., now Modine Manufacturing Company. Modine is the current owner/operator of the facility.

Before Modine purchased the facility, Sundstrand submitted a closure plan in September 1990 to terminate interim status and hold generator status only. The closure plan, with approval from MDNR, was implemented in July 1993. Results from the closure plan revealed a release of hazardous waste beneath the facility Therefore, clean closure could not be granted. As a result, Modine became subject to groundwater monitoring requirements contained in 40 CFR 265 Subpart F This included the requirement that a groundwater monitoring system be installed to determine whether groundwater contamination has occurred due to the storage of hazardous waste at the facility.

This Comprehensive Groundwater Monitoring Evaluation (CME) was prepared as part of Missouri's authorization under RCRA, on behalf of EPA and under the Missouri Hazardous Waste Management Law and Regulations to determine the regulatory and technical adequacy of Modine's RCRA groundwater monitoring system. As a result of this evaluation MDNR has determined that:

1 Modine must draft and submit a Sampling and Analysis Plan that adequately defines the sampling procedures to be followed by sampling personnel.

2 The existing groundwater monitoring wells do not adequately determine the rate and extent of groundwater contamination at the facility Therefore, Modine must install additional monitoring wells

3 Modine must submit an annual groundwater monitoring report that documents the sampling results and activities, operation and maintenance of the groundwater monitoring system and the adequacy of the monitoring system at the facility for the year

# TABLE OF CONTENTS



**TABLES INCLUDED IN REPORT TEXT**

# TABLE OF CONTENTS (CONTINUED)

## APPENDICES

## TABLE 2

## MONITORING WELL COMPLETION DATA

| WELL NUMBER | DATE INSTALLED | CASING MATERIAL | CASING DIAMETER | DEPTH TO SCREEN | SCREENED INTERVAL | TOC ELEVATION (bgs) | TOTAL DEPTH (bgs) |
|---|---|---|---|---|---|---|---|
| MW-1 | 7/92 | PVC | 2" | NR | NR | 186.61' | 161' |
| MW-2 | 7/92 | PVC | 2" | NR | NR | 204.26' | 197' |
| MW-3 | 8/9/95 | Steel Surface Casing to 64', Open Hole 64' to 167' | 5"* 4-3/4" | None | Open Hole 64' to 167' bgs | 193.74' | 167' |
| MW-4 | 8/11/95 | Steel Surface Casing to 44', Open Hole 44' to 158' | 5"* 4-3/4" | None | Open Hole 44' to 158' bgs | 192.24' | 158' |

bgs - below ground surface NR - Not Known * - Surface Casing Diameter

Groundwater monitoring wells MW-3 and MW-4, have shown chronic "insufficient well volume" during sampling events. Both wells have shown detectable levels of VOC contamination during past sampling events, and it is not clear why they are chronically dry If Modine cannot obtain samples from these wells, then a remedy must be sought (i e , redevelopment, well replacement, deepening, etc.) to enable collection at these wells

Special consideration should be given to Modine's close proximity (i e., within a 4 mile radius) to at least 130 private and at least 1 public drinking water well It is important that Modine look at the groundwater situation very seriously since any potential groundwater contamination could have a direct affect on the health of groundwater users in the area It is for this reason that additional monitoring wells to define the limits of potential contamination must be installed in a timely manner

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

Former Hulett Lagoon Site
Combined PA/SI
Reference 55

721 Emerson Road, Suite 220
Saint Louis, Missouri 63141-6748
314 993 4599 Tel
314 993 4895 Fax

October 19, 1998

Mr. Thomas S. Sanicola
Environmental Engineer
Modine Manufacturing Company
1500 DeKoven Avenue
Racine, Wisconsin 53403

RECEIVED
OCT 21 1998
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Re: **Final Letter Report**
**Subsurface Investigation**
**Monitoring Well Installation - Former Hulett Lagoon**
**Camdenton, Missouri**
**Dames & Moore Project No. 27397-035-045**

Dear Mr. Sanicola:

Dames & Moore is pleased to submit this letter report summarizing activities relative to the installation of monitoring well MW-5, at the former Hulett Lagoon in Camdenton, Missouri for the Modine Manufacturing Company (Modine). The former Hulett Lagoon is located approximately 1,000 feet northeast of the Modine facility and appears, based upon the results of a previous field fracture survey, to be the source of the observed trichloroethylene (TCE) impact to groundwater. The purpose of this investigation was to determine the presence or absence of volatile organic compounds (VOCs), in particular, TCE in the groundwater underlying the former Hulett Lagoon.

It is our understanding that the Hulett Lagoon is owned and was operated by the City of Camdenton. The lagoon reportedly received wastewater from a number of commercial and industrial facilities; including Sundstrand Tubular Products (Sundstrand), the former owners and operators of the current Modine facility.

The subsurface investigation field activities were conducted from July 7, 1998, through July 16, 1998. A project specific health and safety plan was developed for Dames & Moore personnel and a health and safety briefing was held prior to initiation of the work.

## 1.0 MONITORING WELL INSTALLATION AND GROUNDWATER SAMPLING

Layne-Western Company, Inc. of St. Louis, Missouri was subcontracted by Dames & Moore for drilling services. The monitoring well was drilled using a truck-mounted hollow stem auger drilling rig and an air rotary drilling rig. Following completion, the monitoring well was

DAMES & MOORE

A DAMES & MOORE GROUP COMPANY



surveyed for location and elevation relative to the existing monitoring wells at the Modine facility by Robert F. Arnold & Associates of Camdenton, Missouri.

The shallow, non-lithified material was drilled utilizing a hollow stem auger drilling rig. Soil samples were continuously collected with a two and one half foot long split spoon sampler advanced ahead of the augers with a hydraulic hammer. The soil samples were logged by Dames & Moore personnel in accordance with the Unified Soil Classification System (USCS).

Each soil sample collected was stored in a Zip-loc® bag. A photoionization detection (PID) reading was taken of the headspace gas in each of the bagged samples by puncturing the plastic with the tip of the PID probe. The headspace reading is used to approximate organic vapor concentrations. The PID, a Thermo-Environmental OVM Model 580-B, was calibrated daily to a 100 parts per million (ppm) isobutlyene standard. There was no field evidence of impact to the soil based on the PID readings and olfactory indications in the monitoring well; therefore, no soil samples were submitted to the laboratory for analysis. PID readings are presented on the monitoring well log.

Once bedrock was encountered, a temporary casing was set at a depth of 10.5 feet below ground surface (bgs) and the hole was re-entered and diamond cored (NX core) to a depth of approximately 104 feet bgs. The purpose of the temporary casing was to ensure that water used in the coring operation could be recovered and recirculated. Potable water from the City of Camdenton public water supply was used as the coring fluid.

The bedrock was continuously cored using a ten foot NX core barrel. All core material was appropriately marked, logged according to standard logging methods, and stored in NX core boxes. As each core run was removed from the barrel, the bedrock was field screened using the PID. The probe of the PID was run along the length of the core to determine the presence of organic vapors. There was no evidence of impact to the bedrock based on the PID readings and olfactory indications. A well log is attached to this letter report.

The original intent had been to core the well to total depth. However, water loss was encountered during the drilling process beginning at a depth of approximately 22 feet bgs. Water loss appears to have occurred due to the presence of open fractures and void spaces. The water loss problem increased as the boring was deepened, so that the coring operation was terminated at a depth of 104 feet bgs. A total of approximately 5,000 gallons of potable water was lost to the formation.

Following coring activities, the hole was re-entered and reamed out to a depth of approximately 118 feet bgs. Groundwater was encountered at an approximate depth of 105 feet bgs.

Permanent surface casing was installed in competent bedrock to a depth of approximately 37 feet bgs. This depth was chosen in order to case off several void spaces which had been encountered during the drilling, notably the void space from 35.0 to 36.5 feet bgs. The monitoring well was constructed with schedule 80, two-inch inside diameter, polyvinyl chloride (PVC) casing with a 0.010 inch slotted screen in accordance with "Missouri Well Construction Rules, June 1996". The well is completed with a screen length of thirty feet and contains a filter pack that extends approximately four feet above the top of the screen. Approximately five feet of bentonite pellets were placed above the filter pack to serve as an annular seal, and were hydrated. Bentonite grout was placed in the hole to approximately 10 feet bgs. The remaining depth was completed with bentonite pellets to approximately one foot below the top of PVC casing. The well was completed approximately two and one half feet above surface grade with a 6-inch diameter protective casing surrounded by a two foot square concrete surface pad. A locking cap was placed on the protective casing to ensure the integrity of the well.

Prior to sampling, the well was gauged to assess the groundwater level and determine the volume of water to be purged. An attempt was made to air lift the water out during development; however, due to the limited water column and the low recharge rate, the procedure was unsuccessful. In order to develop the well, approximately 10 well volumes of groundwater were removed (approximately 30 gallons). The monitoring well was purged in accordance with RCRA Ground-Water Monitoring TEGD guidelines. Purging was done with a dedicated, disposable, polyethylene bailer and new poly-rope. The purged water was containerized in an on-site 55-gallon drum.

The well was sampled using a dedicated disposable bailer and new poly-rope. The bailer was slowly lowered into the water to minimize agitation. Samples were transferred from the bailer to the sample containers in a manner as to minimize agitation and aeration. Personnel conducting the groundwater sampling wore a new pair of clean disposable latex gloves. A duplicate sample was also collected from the well. The samples were shipped, under proper Chain-of-Custody, in an iced cooler by overnight delivery service to Specialized Assays, Inc. and were analyzed for volatile organic compounds (VOCs) by EPA Method 8260.

Measures were taken to reduce the possibility of cross contamination between sampled intervals. After each use, the soil samplers were decontaminated with a high pressure wash. Personnel who handled tools and collected samples wore a new pair of disposable latex gloves for each sample

acquisition. A decontaminated set of augers, barrel rods, and air rotary rods were used for the installation of the monitoring well.

Investigation-derived waste was segregated according to waste type. The purged water was stored in a 55-gallon drum which remains stored near MW-5 for future use. The water used in the air rotary process and the reamed bedrock material were stored in 55-gallon drums. The drums were properly labeled and staged at the facility in a fenced in area on the west side of the building. Modine is responsible for the proper disposal of these investigation-derived waste.

## 2.0 ANALYTICAL RESULTS

Soil samples were not submitted to the laboratory for analysis. A groundwater sample and a duplicate sample were collected from MW-5 for analysis. Additionally, a water sample was collected from the decontamination water holding tank and the coring water holding tank. The results obtained for each of the samples are summarized below:

- Monitoring Well MW-5: The groundwater sample collected from MW-5 exhibited a concentration of TCE at 484.1 ppb and cis-1,2-dichloroethene at 28.0 ppb. A duplicate sample was collected from MW-5 which exhibited a concentration of TCE of 458.5 ppb and cis-1,2-dichloroethene of 28.2 ppb.

- Core Holding Tank: The water collected from the core holding tank originated at the facility and exhibited a TCE concentration of 3.0 ppb.

- Decontamination Holding Tank: The water collected from the decontamination holding tank originated at the facility and exhibited a TCE concentration of 3.2 ppb.

## 3.0 GROUNDWATER ELEVATIONS

Groundwater depths relative to top of casing were determined for all five monitor wells on July 31, 1998. Groundwater depths were determined using a decontaminated Solinst® electronic water level indicator. This indicator was decontaminated between each use. The resulting groundwater elevations, along with the surveyed elevations of the casing tops are shown in Table 1.

The groundwater elevations (Figure 1) confirm the generally trough-like configuration of the groundwater potentiometric surface, which has been observed in previous gauging events. MW-1

is approximately in the center of the trough-like surface. Data from MW-5 demonstrate that groundwater is flowing generally to the southwest, in the direction of the Modine facility. This flow direction is parallel to the direction of the primary fracture set identified in the 1996 Fracture System Investigation. These data strongly suggest that TCE in groundwater beneath the former Hulett lagoon is the source for TCE-impacted groundwater at MW-4.

## 4.0 GEOPHYSICAL LOGGING

Dames & Moore contracted with Century Geophysical Corporation (Century) to perform geophysical logging of MW-5. This logging was accomplished on July 31. 1998 and was witnessed by Ms. Miesche Francis of Dames & Moore.

The suite of logs run in this well included induction resistivity, gamma ray, and neutron. The 2-inch diameter casing size prevented running the density tool. Since the well contained water only at the base, acoustic and spontaneous potential logs were not run. Copies of the geophysical logs are included as Appendix B.

The results of the logging are discussed below. <u>All depths discussed in this section are depth below top of casing, except as noted.</u>

The resistivity log for MW-5 indicates metallic casing installed to a depth of 40 feet. Rock beneath this casing is shown to be fairly high in resistivity, which is consistent with carbonate rock, and fairly uniform. Both the resistivity and the gamma ray curves do not support major changes in lithology. A conspicuous gamma ray peak, which corresponds to a resistivity low, occurs at 84 feet. This appears to be the same feature observed in all four of the other wells and was referred to in the 1996 fracture system report as the "gamma marker". In all five wells, this feature marks the upper boundary of an increase in resistivity. The gamma marker is estimated to be approximately three feet thick in MW-5. The neutron response increases for nearly 20 feet below the gamma marker, indicating less porous rock. According to the core log, the gamma marker corresponds approximately with a fractured, vuggy crystalline limestone, which overlies a relatively nonporous grainstone. The structural elevation of the gamma marker is 95.44 feet, approximately 30 feet higher relative to the marker at the Modine plant. Therefore, any stratigraphic component of flow in the unsaturated zone may be in the direction of the Modine facility (Figure 2).

## 6.0 FUTURE TASKS

Dames & Moore has begun the procedures to conduct a groundwater tracing event at the facility. The proper documents have been completed and submitted to the Missouri Department of Natural Resources (MDNR) to obtain permission to conduct this trace. As of the date of this letter report, Dames & Moore has not received a response from the MDNR. However, dye bugs consisting of activated charcoal were placed in all of the on-site monitoring wells (MW-1, MW-2, MW-3, and MW-4) for the purpose of background sampling to determine if fluorescein dye exists in the groundwater beneath the facility. The dye bugs were lowered in the well column approximately half way into the groundwater and left in place for one week. The dye bugs along with a grab groundwater sample were collected from all of the on-site wells and a grab groundwater sample was also collected from the City of Camdenton Mulberry Well. The samples were placed in appropriate containers and shipped via overnight courier to Ozark Underground Laboratory, Inc. to determine the presence, if any, of fluorescein.

## 7.0 SUMMARY AND CONCLUSIONS

TCE was detected in the groundwater sample collected from MW-5 located near the former Hulett Lagoon. The concentration of TCE significantly exceeds the Drinking Water Standards and Health Advisories level of 5 ppb for TCE. Groundwater appears to flow southwest from the former Hulett Lagoon towards the Modine facility. Based upon these results, it is Dames & Moore's opinion that the source of the TCE in the groundwater beneath the Modine facility is the former Hulett Lagoon.

Dames & Moore is pleased to present this letter report summarizing the activities associated with the installation of MW-5 at the former Hulett Lagoon and additional tasks associated with the subsurface investigation at the Modine facility in Camdenton, Missouri. If you have any questions or comments regarding the contents of this report, please contact either of the undersigned at (314) 993-4599.

Very truly yours,

DAMES & MOORE

Daniel J. Price, R.G.
Managing Principal
St. Louis Office

J. Ronald Sides, Ph. D.
Senior Geologist

DJP/JRS:nkh
P \045\10-OCT98\MISC_JOB\CORRSPND\SANI_19.JRS

# TABLE 1

Groundwater Elevations
July 31, 1998
Modine Heat Transfer Facility
Camdenton, Missouri

| | Casing Elevation | Depth to Water | Groundwater Elevation |
|---|---|---|---|
| MW-1 | 186.61 | 153.75 | 32.86 |
| MW-2 | 204.26 | 166.46 | 37.80 |
| MW-3 | 193.74 | 154.78 | 38.96 |
| MW-4 | 192.24 | 159.46 | 32.78 |
| MW-5 | 179.44 | 104.19 | 75.25 |

* Elevation references a coordinate system previously established for this project.

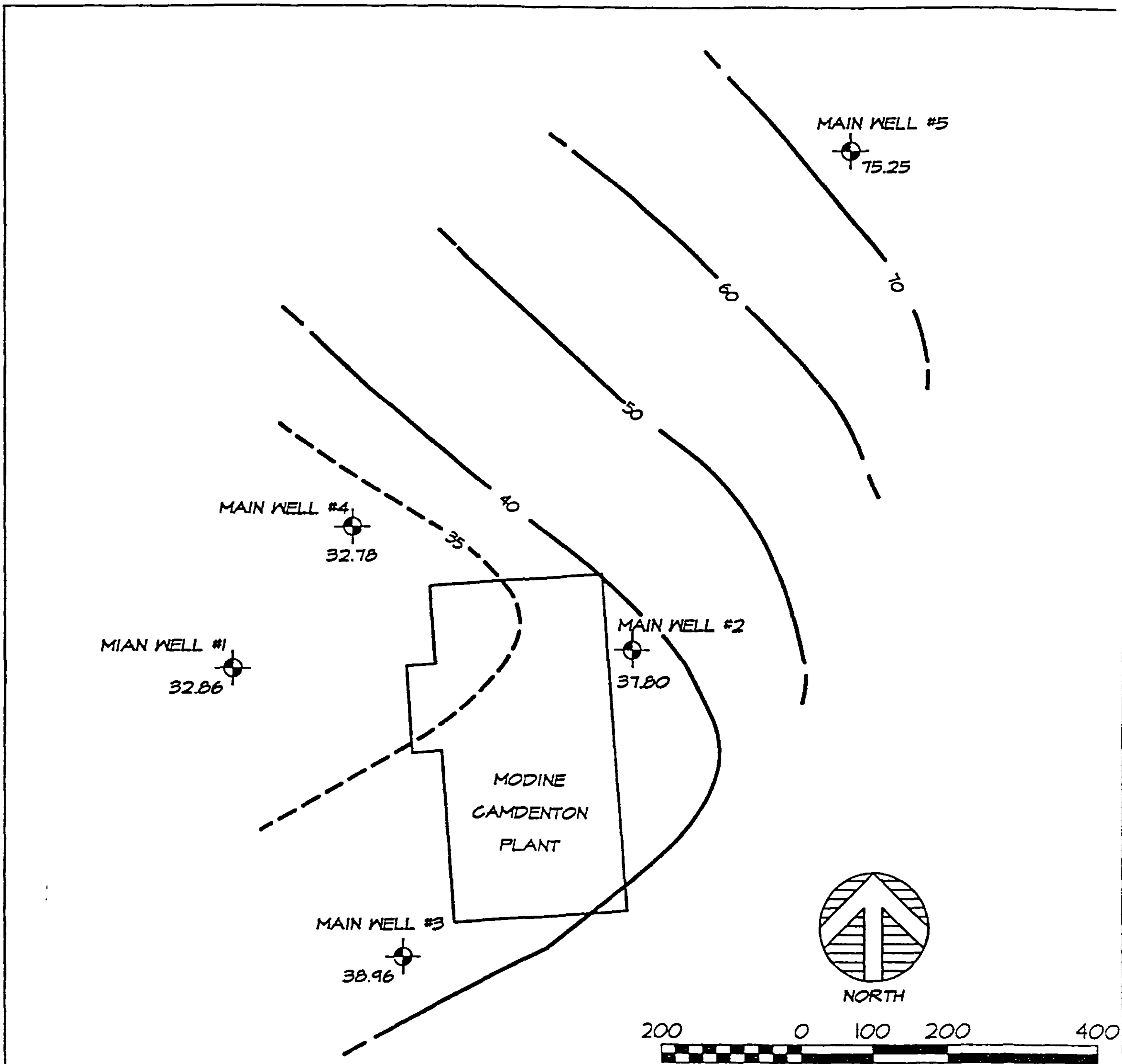



**FIGURE 1**
**GROUNDWATER ELEVATIONS [ft]**
**ON JULY 31, 1998**

**MODINE HEAT TRANSFER, INC.**
**CAMDENTON, MISSOURI**

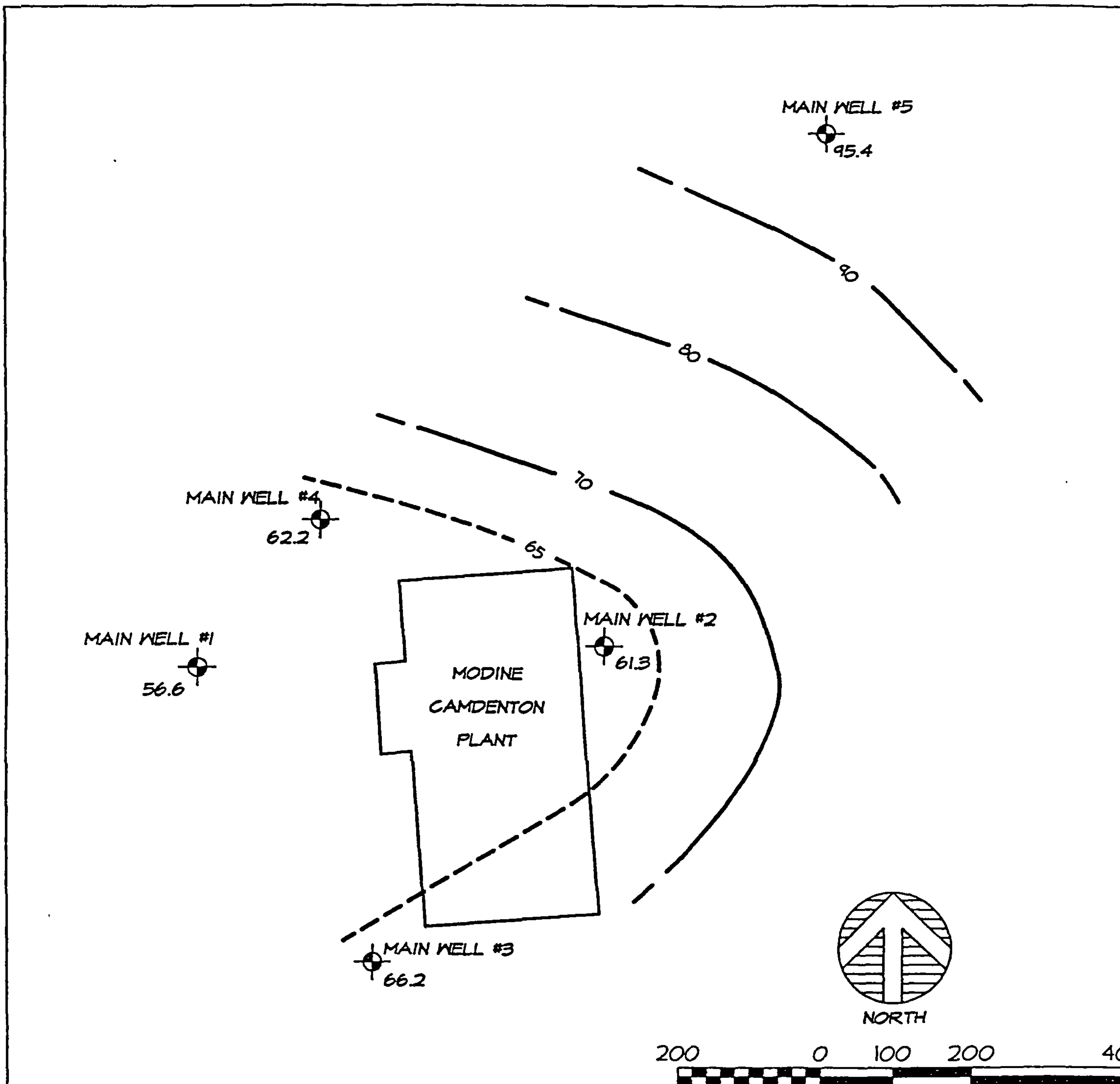
NOTE:
VERTICAL DATUM IS PROJECT SPECIFIC, NOT USGS.

CONTOUR INTERVAL IS 10 FEET, EXCEPT WHERE DASHED (5 FEET).

| | |
|---|---|
| DATE: Aug. 20, 1998 | |
| JOB NO.: 27397-035-05 | |
| DRAWN BY JMS | CHK'D BY JRS |
| SCALE: AS SHOWN | |


DAMES & MOORE
GROUP
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599


R:\ENV\27397.035\MODINEF1.DWG 08/20/98




NOTE:
VERTICAL DATUM IS PROJECT SPECIFIC, NOT USGS.

CONTOUR INTERVAL IS 10 FEET, EXCEPT WHERE DASHED (5 FEET).

**FIGURE 2**
**SUBSURFACE STRUCTURE**
**ELEVATION OF GAMMA MARKER**

**MODINE HEAT TRANSFER, INC.**
**CAMDENTON, MISSOURI**

| | |
|---|---|
| DATE: Aug. 20, 1998 | |
| JOB NO.: 27397-035-05 | |
| DRAWN BY: JMS | CHK'D BY: JRS |
| SCALE: AS SHOWN | |

DAMES & MOORE GROUP
DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599

R:\ENV\27397.035\MODINEF2.DWG 08/20/98

# GEOLOGIC LOG

Sheet No. 1 of 6
Date 7-7-98

PROJECT MADINE SUBSURFACE INVESTIGATION

Hole No. MW-5
Feature Former Hulett Lagoon
Coordinates: N
E
Core Sizes

Angle (from Horizontal) Vertical
Bearing
Date Started 7-7-98
Date Completed 7-10-98
Total Depth 104'

Ground Elevation
Rock Elevation
Overburden Thickness 10.5'
Ground-Water Elevation 104.2 (7-16-98)
Logged by M.M. FRANCIS

| Depth (Elevation) | Graphic Log: Lithology | Structure | Attitude | Classification and Physical Condition | C.R.–Graphic | Core Rec. % | RQD % | | Remarks (Sample Data, Water Levels, Drilling Characteristics etc.) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 1 | | | | ML BROWN SILTY CLAY with brownish yellow stringers, soft, dry, with trace cherty gravel grading to BROWNISH YELLOW. | | | | | 50% Recovery |
| 2 | | | | | 2 | 5 | 5 | 7 | ovm 9.8 #1 0-2' |
| 3 | | | | CL YELLOWISH RED CLAY with brown stringers, hard, moist, stiff, with cherty gravel | | | | | 50% Recovery |
| 4 | | | | | 4 | 4 | 7 | 8 | ovm 10.7 #2 2-4' |
| 5 | | | | | | | | | 75% Recovery |
| 6 | | | | | 4 | 6 | 10 | 10 | ovm 8.8 #3 4-6' |
| 7 | | | | 1" chert lens at 7.0' | | | | | 100% Recovery |
| 8 | | | | | 3 | 4 | 9 | 10 | ovm 16.2 #4 6-8' |
| 9 | | | | Slight gray [illegible] | | | | | 50% Recovery |
| 10 | | | | Weathered limestone, lt. brown, chert bearing | 4 | 6 | 11 | 50/4" | ovm 5.9 #5 8-10' |
| 11 | | | | Top of Rock at 10.5' | | | | | Core #1 Start 3:55 P Stop 4:25 P |
| 12 | | | | Xtalline Limestone, Grainstone, Light Gray, thin layers of more finely Xtalline rock, porous | | | | | Fracture not open |
| 13 | LS | | | | | 100% | 56% | | ovm 0.0 |
| 14 | | | | | | | | | |
| 15 | | | | Vuggy and Chert bearing 14.5'-15.0' Bedding Plane Joints | | | | | |
| 16 | | | | Limestone, grainstone, lt. gray, porous vuggy | | | | | Core #2 Start [illegible] A Stop [illegible] A |
| 17 | | | | Muddy grainstone [illegible] gray and tan | | 100% | 53% | | Fractures not open |
| 18 | | | | Chert bearing 18.2'-18.5' | | | | | No PID reading |
| 19 | | | | Limestone grainstone lt. gray [illegible] | | | | | Core #3 Start [illegible] A Stop [illegible] A |

7/8/98

# GEOLOGIC LOG

Sheet No. 2 of
Date 7-8-98

PROJECT Mobile [illegible] Investigation

Hole No. MW-5
Feature Former Hulett Lagoon
Coordinates: N
E
Core Sizes

Angle (from Horizontal) Vertical
Bearing
Date Started 7-7-98
Date Completed 7-10-98
Total Depth 104'

Ground Elevation
Rock Elevation
Overburden Thickness 10.5'
Ground-Water Elevation
Logged by M. M. [illegible]

| Depth (Elevation) | Lithology | Structure | Attitude | Classification and Physical Condition | C.R.–Graphic | Core Rec. % | RQD % | Remarks (Sample Data, Water Levels, Drilling Characteristics etc.) |
|---|---|---|---|---|---|---|---|---|
| | | | 0 | [illegible] | | | | Fractures not open |
| 21 | | | 5 | | | | | |
| | | | 70 | 21.2' 70° Fracture. | | | | 1" fluid loss |
| | | | 0 | Limestone | | | | |
| 22 | LS | | 8 | [illegible] mottled | | 93% | 34% | [48" x 96" trough] |
| 23 | | | 0 | Limestone [illegible] | | | | |
| | | | 60 | 23.3' 60° Fracture, Limestone [illegible] mottled [illegible] | | | | |
| 24 | | | | | | | | Core #4 Start 10:14A Stop 11:14A |
| 25 | | | | Limestone, [illegible] banded [illegible] | | | | |
| 26 | | | 0 | | | | | |
| | | | 0 | Open fractures | | | | |
| 27 | | | | VOID 26.6' - 27.6' | | | | Clay seam |
| 28 | | | 0 | Limestone, [illegible] | | | | |
| | LS | | | | | | | |
| 29 | | | | | | 66% | 42% | |
| | | | 0 | 29.4' open fracture | | | | |
| 30 | | | 0 | 30.1' [illegible] | | | | 2" fluid loss [illegible] |
| | | | 0 | | | | | |
| 31 | | | 8 | | | | | |
| 32 | | | | | | | | 4" fluid loss [illegible] |
| 33 | | | | VOID 32.1' - 33.5' | | | | |
| 34 | | | 45° | Chert, [illegible] | | | | 6" fluid loss [illegible] |
| | | | 90° | | | | | Core #5 Start [illegible] Stop [illegible] |
| 35 | | | | | | | | |
| | | | | VOID 35.0' - 36.5' | | | | No circulation |
| 36 | | | | | | 60% | 20% | 100% fluid loss |
| 37 | LS | | | Limestone, [illegible] clay vugs, [illegible] | | | | Open fractures |
| 38 | | | | 38.0' - 38.3' | | | | |
| 39 | | | | VOID 38.5' - 39.0' | | | | |
| | LS | | | Limestone [illegible] | | | | Core #6 [illegible] |

# GEOLOGIC LOG

Sheet No. ____
Date 7-__

PROJECT MOLINE SUBSURFACE INVESTIGATION

| | | |
|---|---|---|
| Hole No. MW-5 | Angle (from Horizontal) Vertical | Ground Elevation |
| Feature Former Hulett Loader | Bearing | Rock Elevation |
| Coordinates: N | Date Started 7-7-98 | Overburden Thickness 10.5' |
| E | Date Completed 7-10-98 | Ground–Water Elevation |
| Core Sizes | Total Depth 10__' | Logged by M.M. FRANCIS |

| Depth (Elevation) | Lithology | Structure | Attitude | Classification and Physical Condition | C.R.–Graphic | Core Rec. % | RQD % | | Remarks (Sample Data, Water Levels, Drilling Characteristics etc.) |
|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | |
| 41 | | | 45 | 40.6' 45° fracture | | | | | |
| | | | 0 | Chert, gray to light gray banded | | | | | |
| 42 | | | 0 | 42.0-42.8' Chert, rubble, with glauconite fractured | | 100 % | 30 % | | |
| 43 | | | 0 | | | | | | |
| 44 | | | 0 | Limestone rubble, lt. brown w/sandstone | | | | | |
| | | | | Limestone, grainstone, brown | | | | | Core# 7 Start 5:10P |
| | | | 0 | 44.5' Open fractures | | | | | |
| 45 | | | 0 | | | | | | |
| | | | 65 | 45.3' 65° fracture | | | | | |
| 46 | LS | | | Limestone, mudstone, lt brown to beige, mottled | | | | | |
| 47 | | | | Limestone, grainstone, banded, lt brown to beige, vuggy | | | | | |
| 48 | | | | 48.3' Limestone, mudstone to grainstone lt brown | | 99 % | 67 % | | |
| 49 | | | 0 | | | | | | |
| 50 | | | 35 | 49.8' 35° fracture | | | | | |
| | | | 0 | | | | | | |
| 51 | | | 0 | | | | | | |
| 52 | | | 0 | | | | | | |
| | | | 75 | 52.2' 75° fracture | | | | | OVM 0.0 Stop 6:10P |
| 7-9-98 | | | 0 | | | | | | 7-9-98 Start 7:30A |
| 53 | | | 0 | Chert rubble, banded gray to lt gray | | | | | Numerous attempts made to complete run. Stop 12:45P |
| | | | 70 | 53.3' Limestone, grainstone, brown. mottled | | | | | |
| | | | 75 | 53.5' 70° fracture 53.8' 75° fracture | | | | | |
| 54 | | | 0 | Chert, lt beige, vuggy | | | | | Core# 8 Start 1:00P |
| | | | 0 | Limestone, grainstone, lt brown, chert bearing | | | | | Stop 1:26P |
| 55 | | | 90 | 55.7' 90° open fracture | | | | | OVM 0.0 |
| | | | 0 | Chert, rubble, gray | | | | | |
| 56 | | | 0 | Limestone, mudstone, lt brown, mottled chert bearing (beige) | | 100% | 60% | | |
| 57 | | | | | | | | | |
| 58 | | | | chert, gray, vuggy | | | | | |
| | | | 0 | | | | | | |
| 59 | | | 45 | 59.0' 45° open fracture | | | | | |
| | | | 0 | | | | | | Core# 9 Start 1:35P |

# GEOLOGIC LOG

Sheet No. 4 of 6
Date 7-9-98

PROJECT MODINE SUBSURFACE INVESTIGATION

| | | |
|---|---|---|
| Hole No. MW-5 | Angle (from Horizontal) | Ground Elevation |
| Feature Former Hulk Lt Lagoon | Bearing | Rock Elevation |
| Coordinates: N | Date Started 7-7-98 | Overburden Thickness 10.5' |
| E | Date Completed 7-10-98 | Ground–Water Elevation |
| Core Sizes | Total Depth 104' | Logged by M.M. FRANCIS |

| Depth (Elevation) | Lithology | Structure | Attitude | Classification and Physical Condition | C.R.–Graphic | Core Rec. % | RQD % | | | Remarks (Sample Data, Water Levels, Drilling Characteristics etc.) |
|---|---|---|---|---|---|---|---|---|---|---|
| 60 | | | 0 | 60.0' open fracture | | | | | | |
| | | | 70 | chert, rubble gray | | | | | | |
| 61 | | | 0 | 61.2' Limestone, lt brown | | | | | | |
| | | | | 61.4' Chert | | | | | | |
| 62 | | | 0 90° | 61.6' Limestone, grainstone, lt brown banded, vuggy, mottled | | 96% | 50% | | | OVM 0.0 |
| | | | 0 0 | | | | | | | |
| 63 | | | 0 | 62.0' open fractures | | | | | | |
| | | | | 62.5' Limestone, lt brown, chert bearing. | | | | | | |
| 64 | | | | | | | | | | Core# 10 Start 2 ¼p Stop 2:5?p |
| 65 | LS | | 0 | Limestone, grainstone, chert bearing, vuggy, mottled, banded lt beige | | | | | | |
| 66 | | | 0 | | | 100% | 85% | | | OVM 0.0 |
| 67 | | | 0 | | | | | | | |
| 68 | | | 90° | chert, lt. gray to med. gray bands with limestone vugs | | | | | | |
| | | | | 68.2-68.6' vertical open fracture | | | | | | |
| 69 | | | 0 0 | 69.2' Limestone, grainstone, lt. brown to beige banded, mottled, vuggy (chert filled) porous | | | | | | Core# 11 Start 4 50P 5:11P |
| 70 | | | 0 | | | | | | | |
| 71 | LS | | | | | 100% | 88% | | | OVM 0.0 |
| 72 | | | | | | | | | | |
| 73 | | | | Limestone, mudstone, vuggy, chert bearing | | | | | | |
| 7-10-98 74 | | | | FORMAES LOSS OF 0.5' | | | | | | |
| | | | | Limestone, grainstone, lt brown, banded, vuggy, chert bearing | | | | | | Core# 12 Start 11:32A 7-10-98 Stop 1:45P |
| 75 | LS | | 0 0 0 | open fractures | | | | | | |
| 76 | | | | | | | | | | OVM 0.0 |
| 77 | | | | | | | | | | |
| 78 | | | 0 | open fracture | | 98% | 84% | | | |
| | | | 0 | chert, lt. beige, mottled with gray bands | | | | | | |
| 79 | | | | | | | | | | |
| | | | 0 | open fracture. | | | | | | |

# GEOLOGIC LOG

Sheet No. 5 of 6
Date 7-10-98

PROJECT MODINE SUBSURFACE INESTIGATION

| | | |
|---|---|---|
| Hole No. MW-5 | Angle (from Horizontal) | Ground Elevation |
| Feature Former Hulett Lagoon | Bearing | Rock Elevation |
| Coordinates: N | Date Started 7-7-98 | Overburden Thickness 10.5' |
| E | Date Completed 7-10-98 | Ground–Water Elevation |
| Core Sizes | Total Depth 104' | Logged by M. M. Francis |

| Depth (Elevation) | Graphic Log: Lithology | Graphic Log: Structure | Graphic Log: Attitude | Classification and Physical Condition | C.R.–Graphic | Core Rec. % | RQD % | | Remarks (Sample Data, Water Levels, Drilling Characteristics etc.) |
|---|---|---|---|---|---|---|---|---|---|
| 80 | | | 0 | Chert, gray to med. gray banded; open fracture | | | | | |
| 81 | | | | Limestone, brown, xystalline; Chert, gray, mottled, vuggy | | | | | |
| 82 | | | 0 | Limestone, lt brown | | 98% | 84% | | |
| 83 | | | 0, 0 | Chert, gray banded; Limestone, brown, vuggy | | | | | |
| | | | 45, 0, 0 | 83.6' 45° fracture | | | | | |
| 84 | | | | | | | | | Core #13 Start 1:55p Stop 2:38p |
| 85 | | | | Chert, gray to lt gray banded | | | | | |
| 86 | | | 90°, 0 | Open vertical fracture | | | | | OVM 0.0 |
| 87 | | | | Limestone, lt brown; Chert (86.0') | | | | | |
| 88 | | | 0 | Limestone, grainstone, chert bearing, vuggy, mottled | | | | | |
| 89 | | | 0, 45 | | | 92% | 73% | | |
| 90 | | | 30, 0 | | | | | | |
| 91 | | | | | | | | | |
| 92 | | | | | | | | | |
| 93 | | | 0, 0 | | | | | | |
| 94 | | | 0 | Limestone, porous, [illegible], lt. brown [illegible] | | | | | Core #14 Start 3:17P Stop 3:50P |
| 95 | | | 0 | Chert, med. gray mottled, vuggy | | | | | |
| 96 | | | 0 | | | | | | OVM 0.0 |
| 97 | | | | Limestone, lt. brown, grainstone banded | | 98% | 75% | | |
| 98 | | | | | | | | | |
| 99 | | | 0 | [illegible] | | | | | |

# GEOLOGIC LOG

Sheet No. 6 of 6
Date 7-10-98

PROJECT MODINE SUBSURFACE INVESTIGATION

| | | |
|---|---|---|
| Hole No. MW-5 | Angle (from Horizontal) | Ground Elevation |
| Feature FORMER HULETT LAGOON | Bearing | Rock Elevation |
| Coordinates: N | Date Started 7-7-98 | Overburden Thickness 10.5' |
| E | Date Completed 7-10-98 | Ground—Water Elevation |
| Core Sizes | Total Depth 104' | Logged by M.M. FRANCIS |

| Depth (Elevation) | Graphic Log: Lithology | Graphic Log: Structure | Graphic Log: Attitude | Classification and Physical Condition | C.R.—Graphic | Core Rec. % | RQD % | | Remarks (Sample Data, Water Levels, Drilling Characteristics etc.) |
|---|---|---|---|---|---|---|---|---|---|
| 100 | | ≈ | 0 | Limestone, lt gray, porous grain-stone | | | | | |
| 101 | | | | | | | | | |
| 102 | LS | | | Chert, lt gray with dark gray vugs | | | | | |
| 103 | | | | Limestone, grainstone, lt. brown banded, mottled, chert bearing | | | | | |
| 104 | | ≈ | 0 | END OF CORE | | ▽ | ▽ | | |

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

RECEIVED
NOV - 5 1998

721 Emerson Road, Suite 220
Saint Louis, Missouri 63141-6748
314 993 4599 Tel
314 993 4895 Fax

# Fax Sheet

To CHRIS KUMP

Company MDNR

Fax Number 573-526-5268

From RON SIDES

Date 11/5/98

Subject MODINE

No. of pages 7

ANALYTICAL REPORTS, MW-5

1) SAMPLE

2) SAMPLE DUP

3) TRIP BLANK

CALL WITH ANY QUESTIONS

# ANALYTICAL REPORT

DAMES & MOORE 7378
DEBORAH Y. WHITAKER
2135 E. SUNSHINE, SUITE 105
SPRINGFIELD, MO 65804

Lab Number: 98-A83247
Sample ID: MW05-GW1-Q1-98
Sample Type: Ground water
Site ID:

Project: 27397-035-045
Project Name: MODINE SUBSURFACE INVEST
Sampler: MIESCHE FRANCIS

Date Collected: 7/16/98
Time Collected: 12:52
Date Received: 7/17/98
Time Received: 9:00

| Analyte | Result | Units | Report Limit | Quan Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| *VOLATILE ORGANICS* | | | | | | | | | | |
| Acetone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Benzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Bromobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Bromochloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Bromoform | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Bromomethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 2-Butanone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| n-Butylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| sec-Butylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| t-Butylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Carbon disulfide | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Carbon tetrachloride | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Chlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Chloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 2-Chloroethylvinylether | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Chloroform | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Chloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 2-Chlorotoluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 4-Chlorotoluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,2-Dibromo-3-chloropropane | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Dibromochloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,2-Dibromoethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Dibromomethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,2-Dichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,3-Dichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,4-Dichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Dichlorodifluoromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,1-Dichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,2-Dichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,1-Dichloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| cis-1,2-Dichloroethene | 0.0280 | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| trans-1,2-Dichloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 19 |
| 1,2-Dichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 1 |

# ANALYTICAL REPORT

**Laboratory Number: 98-A83247**
**Sample ID: MW05-GW1-Q1-98**

**Page 2**

| Analyte | Result | Units | Report Limit | Quan Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Dichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 2,2-Dichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,1-Dichloropropene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| cis-1,3-Dichloropropene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| trans-1,3-Dichloropropene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Ethylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Hexachlorobutadiene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 2-Hexanone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Isopropylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 4-Isopropyltoluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 4-Methyl-2-pentanone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Methylene chloride | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Naphthalene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| n-Propylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Styrene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,1,1,2-Tetrachloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,1,2,2-Tetrachloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Tetrachloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Toluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,2,3-Trichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,2,4-Trichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,1,1-Trichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,1,2-Trichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Trichloroethene | 0.4841 | mg/l | 0.0200 | 0.0020 | 10 | 7/20/98 | 16:39 | G.Norton | 8260B | 199 |
| 1,2,3-Trichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,2,4-Trimethylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| 1,3,5-Trimethylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Vinyl chloride | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Xylenes | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Bromodichloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |
| Trichlorofluoromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:15 | G.Norton | 8260B | 199 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|---|---|---|
| VOA Surrogate, 1,2-Dichloroethane, d4 | 77. | 70. - 131. |
| VOA Surrogate, Toluene d8 | 90. | 83. - 115. |
| VOA Surrogate, 4-Bromofluorobenzene | 88. | 73. - 119. |
| VOA Surrogate, Dibromofluoromethane | 82. | 72. - 130. |

# ANALYTICAL REPORT

DAMES & MOORE 7378
DEBORAH Y. WHITAKER
2135 E. SUNSHINE, SUITE 105
SPRINGFIELD, MO 65804

Project: 27397-035-045
Project Name: MODINE SUBSURFACE INVEST
Sampler: MIESCHE FRANCIS

Lab Number: 98-A83248
Sample ID: MW05-GW1-Q1-98-D
Sample Type: Ground water
Site ID:

Date Collected: 7/16/98
Time Collected: 12:52
Date Received: 7/17/98
Time Received: 9:00

| Analyte | Result | Units | Report Limit | Quan Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| *VOLATILE ORGANICS* | | | | | | | | | | |
| Acetone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Benzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Bromobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Bromochloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Bromoform | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Bromomethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 2-Butanone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| n-Butylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| sec-Butylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| t-Butylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Carbon disulfide | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Carbon tetrachloride | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Chlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Chloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 2-Chloroethylvinylether | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Chloroform | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Chloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 2-Chlorotoluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 4-Chlorotoluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,2-Dibromo-3-chloropropane | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Dibromochloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,2-Dibromoethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Dibromomethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,2-Dichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,3-Dichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,4-Dichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Dichlorodifluoromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,1-Dichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,2-Dichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,1-Dichloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| cis-1,2-Dichloroethene | 0.0282 | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| trans-1,2-Dichloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,2-Dichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |

# ANALYTICAL REPORT

**Laboratory Number: 98-A83248**
**Sample ID: MW05-GW1-Q1-98-D**

**Page 2**

| Analyte | Result | Units | Report Limit | Quan Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Dichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 2,2-Dichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,1-Dichloropropene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| cis-1,3-Dichloropropene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| trans-1,3-Dichloropropene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Ethylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Hexachlorobutadiene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 2-Hexanone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Isopropylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 4-Isopropyltoluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 4-Methyl-2-pentanone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Methylene chloride | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Naphthalene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| n-Propylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Styrene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,1,1,2-Tetrachloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,1,2,2-Tetrachloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Tetrachloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Toluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,2,3-Trichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,2,4-Trichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,1,1-Trichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,1,2-Trichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Trichloroethene | 0.4585 | mg/l | 0.0200 | 0.0020 | 10 | 7/20/98 | 11:57 | G.Norton | 8260B | 199 |
| 1,2,3-Trichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,2,4-Trimethylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| 1,3,5-Trimethylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Vinyl chloride | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Xylenes | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Bromodichloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |
| Trichlorofluoromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 1:51 | G.Norton | 8260B | 199 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|---|---|---|
| VOA Surrogate, 1,2-Dichloroethane, d4 | 82. | 70. - 131. |
| VOA Surrogate, Toluene d8 | 89. | 83. - 115. |
| VOA Surrogate, 4-Bromofluorobenzene | 90. | 73. - 119. |
| VOA Surrogate, Dibromofluoromethane | 85. | 72. - 130. |

# ANALYTICAL REPORT

DAMES & MOORE 7378
DEBORAH Y. WHITAKER
2135 E. SUNSHINE, SUITE 105
SPRINGFIELD, MO 65804

Project: 27397-035-045
Project Name: MODINE SUBSURFACE INVEST
Sampler: MIESCHE FRANCIS

Lab Number: 98-A83249
Sample ID: TRIP BLANK
Sample Type: Ground water
Site ID:

Date Collected:
Time Collected:
Date Received: 7/17/98
Time Received: 9:00

| Analyte | Result | Units | Report Limit | Quan Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| *VOLATILE ORGANICS* | | | | | | | | | | |
| Acetone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Benzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Bromobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Bromochloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Bromoform | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Bromomethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 2-Butanone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| n-Butylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| sec-Butylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| t-Butylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Carbon disulfide | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Carbon tetrachloride | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Chlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Chloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 2-Chloroethylvinylether | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Chloroform | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Chloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 2-Chlorotoluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 4-Chlorotoluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,2-Dibromo-3-chloropropane | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Dibromochloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,2-Dibromoethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Dibromomethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,2-Dichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,3-Dichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,4-Dichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Dichlorodifluoromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,1-Dichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,2-Dichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,1-Dichloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| cis-1,2-Dichloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| trans-1,2-Dichloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,2-Dichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |

# ANALYTICAL REPORT

**Laboratory Number: 98-A83249**
**Sample ID: TRIP BLANK**



| Analyte | Result | Units | Report Limit | Quan Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Dichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 2,2-Dichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,1-Dichloropropene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| cis-1,3-Dichloropropene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| trans-1,3-Dichloropropene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Ethylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Hexachlorobutadiene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 2-Hexanone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Isopropylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 4-Isopropyltoluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 4-Methyl-2-pentanone | ND | mg/l | 0.0100 | 0.0100 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Methylene chloride | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Naphthalene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| n-Propylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Styrene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,1,1,2-Tetrachloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,1,2,2-Tetrachloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Tetrachloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Toluene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,2,3-Trichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,2,4-Trichlorobenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,1,1-Trichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,1,2-Trichloroethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Trichloroethene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,2,3-Trichloropropane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,2,4-Trimethylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| 1,3,5-Trimethylbenzene | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Vinyl chloride | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Xylenes | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Bromodichloromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |
| Trichlorofluoromethane | ND | mg/l | 0.0020 | 0.0020 | 1 | 7/18/98 | 0:01 | G.Norton | 8260B | 199 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|---|---|---|
| VOA Surrogate, 1,2-Dichloroethane, d4 | 100. | 70. - 131. |
| VOA Surrogate, Toluene d8 | 87. | 83. - 115. |
| VOA Surrogate, 4-Bromofluorobenzene | 94 | 73. - 119. |
| VOA Surrogate, Dibromofluoromethane | 95. | 72. - 130. |

Former Hulett Lagoon Site
Combined PA/SI
Reference 57

# MISSOURI DEPARTMEN[illegible]

*Headqu*
2901 West Truman Boulevard, P O Box 180, Jefferson City, Missouri 65102-0180
Telephone 573/751-4115 ◆ Missouri Relay Center. 1-800-735-2966 (TDD)

JERRY M CONLEY, Director

Season's Greetings

December 14, 1998

RECEIVED

DEC 15 1998

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Ms. Julie Kelsey
Department of Natural Resources
P. O. Box 176
Jefferson City, MO 65102-0176

Re: Herculaneum Smelter; Faerber Farm
Former Hulett Lagoon; Highway AF Wells

Dear Ms. Kelsey:

Thank you for your letter of November 2, 1998 regarding rare, threatened and endangered species within the proposed project area.

Review of our records show that public lands, sensitive species or communities are known to exist on or near the above referenced sites. Please refer to the enclosed Heritage Database report for details. This report reflects information we currently have in our database. We provide this information for planning purposes only; it should not be regarded as a definitive statement as to the presence or absence of rare/endangered species or high-quality natural communities. Additional on-site inspections may be needed to verify the presence or absence of such species or communities.

Thank you for the opportunity to review and comment.

Sincerely,

Mary Lyon

MARY LYON
POLICY ANALYST

ML:klm
Enclosure

MO DEPARTMENT OF NATURAL RESOURCES
P.O. BOX 176
JEFFERSON CITY, MO 65102-0176

# FORMER HULETT LAGOON

**The following species and/or natural communities are known to occur on or in the vicinity of the project site:**

| Scientific Name | Common Name | Federal Status | State Status | State Rank | Size/ Acres | Township/ Range | Sec. | Ownership |
|---|---|---|---|---|---|---|---|---|
| **4-mile radius - source #1 and #2** | | | | | | | | |
| SPIRANTHES OVALIS VAR EROSTELLATA | OVAL LADIES' TRESSES | | | S2 | 0 | 037N017W | 01 | DNR |
| AMBYSTOMA ANNULATUM | RINGED SALAMANDER | | | S3 | 0 | 038N017W | 27 | PRIVATE |
| CHERT SAVANNA | | | | S2 | 45 | 037N017W | 02 | DNR |
| DOLOMITE GLADE | | | | S3 | 17 | 037N017W | 11 | DNR |
| CHERT SAVANNA | | | | S2 | 50 | 037N017W | 14 | DNR |
| TYPHLICHTHYS SUBTERRANEUS | SOUTHERN CAVEFISH | | | S2S3 | 0 | 037N017W | 02 | DNR |
| DOLOMITE GLADE | | | | S3 | 24 | 038N017W | 35 | DNR |
| DOLOMITE GLADE | | | | S3 | 12 | 037N017W | 10 | DNR |
| MOIST LIMESTONE/DOLOMITE CLIFF | | | | S4S5 | 0 | 037N017W | 01 | DNR |
| ARDEA HERODIAS | GREAT BLUE HERON | | | S5 | 0 | 037N017W | 03 | DNR |
| DOLOMITE GLADE | | | | S3 | 13 | 037N017W | 12 | DNR |
| DRYOPTERIS CARTHUSIANA | SPINULOSE SHIELD FERN | | | S1 | 0 | 037N017W | 01 | DNR |
| DOLOMITE GLADE | | | | S3 | 21 | 037N017W | 11 | DNR |
| HEMIDACTYLIUM SCUTATUM | FOUR-TOED SALAMANDER | | | S3 | 0 | 037N017W | 02 | DNR |
| MYOTIS GRISESCENS | GRAY BAT | E | E | S3 | 0 | 037N017W | 02 | DNR |
| LIMESTONE/DOLOMITE TALUS | | | | S4S5 | 3 | 037N017W | 01 | DNR |
| DOLOMITE GLADE | | | | S3 | 20 | 037N017W | 11 | DNR |
| MESIC FOREST | | | | S3 | 5 | 037N017W | 01 | DNR |
| DRYOPTERIS GOLDIANA | GOLDIE'S FERN | | | S2 | 0 | 037N017W | 01 | DNR |
| DOLOMITE GLADE | | | | S3 | 14 | 037N017W | 10 | DNR |
| DOLOMITE GLADE | | | | S3 | 12 | 037N017W | 01 | DNR |
| DOLOMITE GLADE | | | | S3 | 10 | 037N016W | 18 | PRIVATE |
| **15 river miles, source #1** | | | | | | | | |
| MYOTIS GRISESCENS | GRAY BAT | E | E | S3 | 0 | 038N018W | 02 | PRIVATE |

# MO DEPARTMENT OF NATURAL RESOURCES

## FORMER HULETT LAGOON

**Additional in formation for planning purposes:**

Gray bats are likely to occur in the project area, as they forage over streams, rivers, and reservoirs in this part of Missouri.

Pallid sturgeons are big river fish that may range widely in the Mississippi River and Missouri River system. Because the preferred habitat and range of the species are unknown, any project that modifies big river habitat or impacts water quality should consider the possible impact to pallid sturgeon populations.

Overwintering bald eagles may occur in the project area, as they are common winter residents in big river habitats and major lakes where they feed on fish.

**Public land in the 4-mile radius, source #1 and #2:**

| | |
|---|---|
| Camdenton Conservation Service Center | Missouri Depratment of Conservation |
| Ha Ha Tonka State Park | Missouri Department of Natural Resources |
| Ha Ha Tonka Savanna Natural Area | Missouri Department of Natural Resources |

**Public land along 15 river miles, source #1:**

| | |
|---|---|
| Larry Gale Access | Missouri Department of Conservation |

FEDERAL STATUS - The federal status is derived from the provisions of the federal Endangered Species Act, which is administered by the U.S Fish and Wildlife Service. The Endangered Species Act provides federal protection for plants and animals listed as Endangered or Threatened. E = Endangered, T = Threatened, C = Candidate for Federal listing.

STATE STATUS (E) - the state status is determined by the Department of Conservation under constitutional authority. Rule 3CSR10-4.111Endangered Species of the *Wildlife Code of Missouri* and certain state statutes apply to state Endangered species

STATE RANK - A numeric rank of relative endangerment based primarily on the number of occurrences of the species within the state of Missouri. S1 = Critically imperiled in the state, S2 = Imperiled in the state, S3 = Rare and uncommon in the state

Heron rookeries, eastern collared lizard populations, natural communities and geologic features are recognized as sensitive biological resources and may also appear on this report

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Columbia Field Office
608 East Cherry Street, Room 200
Columbia, Missouri 65201
Tel: 573/876-1911 Fax: 573/876-1914

IN REPLY REFER TO.

FWS/AES-CMFO

DEC 18 1998

Ms. Julie B. Kelsey
Department of Natural Resources
Hazardous Waste Program
P.O. Box 176
Jefferson City, Missouri 65102-0176

Dear Ms. Kelsey:

This letter is in response to your November 2, 1998 letter asking the U.S. Fish and Wildlife Service (Service) for information on the presence of federally-listed threatened and endangered species, sensitive environments, and wetlands which may be present at or near the Herculaneum Smelter in Johnson County (Township 41N, Range 5E, Section 29), the Faerber Farm in Gasconade County (Township 45N, Range 4W, Section 6), the former Hulett Lagoon in Camden County (Township 38N, Range 17W, Section 24), and the Highway AF Wells in Franklin County (Township 40N, Range 2W, Section 5). This response is provided by the Service under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Environmental Policy Act of 1969 (42 U.S C. 4321-4327), and the Endangered Species Act of 1973, as amended (16 U.S.C 1531-1543).

None of the sites being investigated appear to impact State or Federal fish and wildlife lands or facilities, nor do they impact lands which were acquired or are managed with Federal grant-in-aid assistance under the Wildlife Restoration Act (Pittman-Robertson Act, Public Law 75-415) or the Fish Restoration Act (Dingell-Johnson Act, Public Law 81-681).

**Herculaneum Smelter and Faerber Farm**

Both the Herculaneum Smelter and the Faerber Farm are in close proximity to the Missouri and Mississippi Rivers and habitats associated with the federally-listed endangered pallid sturgeon (*Scaphirhynchus albus*), threatened Bald Eagle (*Haliaeetus leucocephalus*), endangered Interior Least Tern (*Sterna antillarum athalassos*), and endangered Piping Plover (*Charadrius melodius*), which occur along either river during certain times of the year Due to the proximity of the Faerber Farm to the Missouri River and the proximity of the Herculaneum site to Jefferson County, the federally-listed endangered Indiana bat (*Myotis sodalis*) might also occur

<u>Pallid Sturgeon</u>

The federally-listed pallid sturgeon is widely distributed in the Missouri River and also occurs in the Mississippi River south of St. Louis, downstream from the mouth of the Missouri These fish are well adapted to the bottoms of large, turbid, free-flowing rivers with swift water

Major threats to this species include habitat destruction, over harvest, and pollution. Though more research is necessary, it is suspected that pollution of the Missouri River by organic wastes coming from cities, livestock impoundments, industrial areas, and packing houses have negatively affected populations as sites such as these have increased over time and occur in nearly 45% of the pallid sturgeon's range.

In addition, elevated polychlorinated biphenyls (PCB's), cadmium, mercury, and selenium have been detected in tissue samples collected from pallid sturgeon in the Missouri River. Other contaminants, such as chlordane, DDE, DDT, and dieldrin have also been detected. Abandoned landfills, mines, sewage treatment plants, and industries all have high potential to contaminate pallid sturgeon habitat.

Bald Eagle

The federally-listed threatened Bald Eagle frequently winters in forested habitat along the Missouri and Mississippi Rivers. Bald Eagles generally prefer the largest trees (> 12 inches diameter at breast height) for perching and roosting. They generally forage on fish, dead and dying waterfowl, and carrion. Wintering populations have been increasing in Missouri, although counts fluctuate widely from year to year dependent upon ice over in the northern part of the eagle's range. Nesting Bald Eagles are also increasing, but to date, no nest sites are near either the Herculaneum or Faerber sites.

Eagles can be adversely affected by heavy metals, bacteria, and other contaminants. Due to the scavenger behaviors of the eagle, they often feed on dead or dying prey which may have been poisoned in some way or may have elevated bacterial levels. In such cases, eagles can be affected through a secondary pathway in the food chain which could harm or kill individuals. Direct toxic effects of organochlorines such as dieldrin, endrin and DDT have also contributed significantly to declines in eagle populations.

Interior Least Tern

The federally-listed endangered Interior Least Tern currently nests in the Bootheel region of Missouri along the Mississippi River. Terns presently use the Missouri River as a migration corridor from nesting sites in Nebraska and the Dakotas. During these times, May and between August and early September, birds are seen more frequently. They may use shallow, seasonal wetlands located in the Missouri River floodplain to rest and forage. The primary cause of decline for Interior Least Terns is habitat destruction and predation, though elevated levels of heavy metals have been found in egg tissue taken from the bootheel nesting grounds (Charbonneau, pers. comm).

Piping Plover

The federally-listed threatened Piping Plover occur in Missouri as transients during migrational periods to wintering grounds on the Gulf Coast and are predominantly from the Northern Great Plains population. Piping Plovers do not nest in Missouri, and historical records do not indicate they ever did (Fish and Wildlife Service, 1988). Birds only occur very rarely between April and May and August through September during migrational flights. Mud flats, sand bars, and wet open fields on or near the Missouri River floodplain may be utilized during this period for rest and foraging. The primary cause for

Piping Plover decline is habitat destruction, predation, and human disturbance.

Indiana bat

The federally-listed endangered Indiana bat may also occur near these two sites. Indiana bats spend the winter hibernating in caves in the Ozarks. During April and May, females migrate north and establish small maternity colonies in suitable sites within wooded riparian areas, floodplain forests, or upland woodlots. Maternity roost sites tend to be in dead or dying trees greater than 9 inches in diameter at breast height and with loose or exfoliating bark. Trees most likely to have loose or exfoliating bark are dead oaks, hickories, elms, green and white ash, silver maple, and eastern cottonwood, or living shagbark hickory. Preferred roost sites are located in forest openings, at the forest edge, or where tree canopy is sparse, and within 1 km (0.6 mi.) of water where they forage on flying insects. Indiana bats continue to decline in parts of its range, including Missouri. Reasons for decline are habitat disturbance/destruction, deforestation, stream channelization, and pesticides.

Finally, both the sturgeon chub (*Macrhybopsis gelida*) and sicklefin chub (*M. meeki*) have been proposed as Candidates for listing and occur in the Mississippi and Missouri Rivers. To date, they have no protection under the Endangered Species Act, and are provided here for your information only. Both the sicklefin and the sturgeon chub are close associates, occupying the open channels of swift, large, turbid rivers over sand and fine gravel. Neither species have ever been abundant in the Missouri River but are more common in the lower 300 miles of the river.

**Former Hulett Lagoon**

No federally-listed threatened or endangered species occur directly on this site, however, Bald Eagles do winter at the Lake of the Ozarks. Please see our comments above regarding habitat and life history traits of wintering Bald Eagles.

**Highway AF Wells**

The federally-listed endangered Indiana bat has been documented at Meramec State Park. The three creeks listed are not within the same watershed as the Meramec, however, during the summer roosting period, Indiana bats may utilize habitats along each creek as they migrate north. See our comments above regarding Indiana bat habitat and life history traits.

The federally-listed endangered gray bat *(Myotis grisescens)* also has been documented in cave habitats at Meramec State Park. The gray bat occupies a limited geographic range in limestone karst areas of the southeastern United States, including Missouri. With rare exception, the gray bat roosts in caves year-round. In winter, most gray bats hibernate in vertical (pit) caves with cool, stable temperatures below 10 degrees Celsius. Summer caves, especially those used by maternity colonies, are nearly always located within a kilometer (0.6 mile) of rivers or reservoirs over which bats feed. The summer caves are warm with dome ceilings that trap body heat. Most gray bats migrate seasonally between hibernating and maternity caves, and both types of caves are located in Missouri. Gray bats are active at night, foraging for insects

over water or along shorelines, and they need a corridor of forest riparian cover between roosting caves and foraging areas. They can travel as much as 20 kilometers (12 miles) from their roost caves to forage.

We are concerned about the water quality of Spring Creek, Winsel Creek, and the Bourbouse River due to the presence of many mussel "species of concern". The sheepnose (*Plethobasus cyphyus*), snuffbox (*Plagiola triquetra*), and scaleshell (*Leptodea leptodon*) all occur in the Bourbeuse river near the Highway AF Wells. Mussels are extremely sensitive to pollutants and heavy metals, including pesticides, runoff from agricultural fields, livestock wastes, mine tailings, industrial pollutants, and heavy organic loads from sewage. Again, each of these mussel species currently have no protection under that Endangered Species Act and they are provided here for your information.

If you have not already done so, please contact the Missouri Department of Conservation regarding Missouri species of conservation concern (Planning Division, P.O. Box 180, Jefferson City, Missouri 65102).

**Wetlands**

Because your letter did not identify the specific site locations, we can only comment on wetlands in general. There are numerous small farm impoundments within the sections identified in your letter. Though these may have wetland characteristics, the Service is primarily concerned with naturally occurring wetlands. Most wetland habitat near these sites can be found along streams and within the floodplains of major rivers. The Service's National Wetland Inventory (NWI) maps are available for all of Missouri and may help you identify wetlands and other aquatic habitats near each site. NWI maps for approximately the northern two-thirds of Missouri are available free of charge in digital form over the Internet at: *http://www.nwi.fws.gov*. You can also order paper NWI maps through the U.S. Geological Survey's Earth Science Information Center (ESIC). For information and NWI map availability, call ESIC's toll free number 1-800-USA-MAPS. Orders and payment for NWI maps in Missouri should be sent to:

USGS/ESIC
Mid Continent Mapping Center
1400 Independence Road, Mail Stop 231
Rolla, Missouri 65401
(573) 308-3500

Thank you for contacting the Service for the opportunity to review this project. Please contact Ms. Kelly Srigley Werner of my staff at (573) 876-1911 ext. 112 if you have further questions or need additional assistance.

Sincerely,

Rick L. Hansen

for

R. Mark Wilson
Field Supervisor

Former Hulett Lagoon Site
Combined PA/SI
Reference 60

CIESIN Census

SEDAC

# WELCOME!
# MABLE/Geocorr Geographic Correspondence Engine
# Version 3.01

UIC

[OSEDA Mirror] | [SEDAC Mirror] | [CENSUS Mirror]

This application allows you to access the MABLE geographic data base and to generate custom "correlation lists" as reports and/or files.

**Help | Examples | Usage Notes**
**Output Samples | New in V3 | Articles | Future**

This form has 5 main sections. Only the first 2 are required.
**Input | Output | Point & Distance | Bounding Box | Geographic Filter**

*Note: In most of the select-list boxes below you can make multiple selections. Some browsers require that you hold down the ctrl key while clicking before it will recognize multiple selections.*

## Input Options

**Select state(s) to process. (Limit of 5 states on weekdays, 7 AM - 6 PM)**
**(Required Option)**

Random Pick
ALABAMA
ALASKA
ARIZONA
ARKANSAS
CALIFORNIA
COLORADO
CONNECTICUT
DELAWARE

For background information and help with any of the geographic codes used in the MABLE database (source/target geocodes) consult the file:

**MAGGOT**
**(Master Area Geographic Glossary Of Terms)**

| Select "SOURCE" Geocode(s) | Select "TARGET" Geocode(s) |
| --- | --- |

| Source geocodes | Target geocodes |
|---|---|
| Entire Universe [no code] | Entire Universe [no code] |
| --- | --- |
| State (1990) | State (1990) |
| **County (1990)** | County (1990) |
| County Subdivision: MCD (1990) | County Subdivision: MCD (1990) |
| Place: City, Town, Village, etc. (1990) | Place: City, Town, Village, etc. (1990) |
| **Census Tract/BNA (1990)** | Census Tract/BNA (1990) |
| Census Block Group (1990) | Census Block Group (1990) |
| Census Block (1990) (+) | Census Block (1990) (+) |
| 5-digit Postal ZIP Code (circa 7/1991) | 5-digit Postal ZIP Code (circa 7/1991) |
| --- | --- |
| Concentric Ring Pseudo-Geocode (*) | **Concentric Ring Pseudo-Geocode (*)** |
| Hydrologic Unit Code: HUC (***) | Hydrologic Unit Code: HUC (***) |
| --- | --- |
| Urban-Rural Portion (1990) | Urban-Rural Portion (1990) |
| Metro Area: MSA or CMSA (1990) | Metro Area: MSA or CMSA (1990) |
| Primary MSA: PMSA (1990) | Primary MSA: PMSA (1990) |
| Urbanized Area: UA (1991) | Urbanized Area: UA (1991) |
| Congressional District: 102nd (1990) | Congressional District: 102nd (1990) |
| Congressional District: 103rd (1992) | Congressional District: 103rd (1992) |
| PUMA: Code A, 5% Sample (PUMS 1990) | PUMA: Code A, 5% Sample (PUMS 1990) |

**Notes:**

+ If you chose census block then you may not choose more than 5 states.

* If you chose "Concentric Ring Pseudo-Geocode" from either list (above) then you **must** specify the "Point and Distance" **or** "Ring Geocode" options below.

** The 95 MSA and PMSA codes are not available in New England. NECMA95 codes are available *only* for New England.

*** Hydrologic Unit Codes are normally 8 digits, but you can specify keeping only the first 2, 4 or 6 (region, subregion and accounting units). These codes not available for Alaska and Hawaii.

- **Digits of Hydrological Unit Codes to keep:** ○ **2** ○ **4** ○ **6** ◉ **8**

**Weighting Variable:**

Specify the weighting variable to use for determining the portion of the source geocodes corresponding to the target geocodes:

- **Population (1990 census)**
- Land Area (square km)
- Housing Units (1990 census)

☐ Ignore Census Blocks with a value of 0 for the weighting variable.

## Output Options

| | | |
|---|---|---|
| ☐ Have weighted centroids calculated and kept on the output file(s) | ☐ Generate 2nd allocation factor (AFACT2): portion of *target* geocodes in *source* geocodes | ☑ Sort by target geocodes, then source geocodes (default is by source, then target) |

You have your choice of 2 output formats: a comma-separated-value (".csv") file **and/or** a report format (".lst") file. For each file you can specify whether you want just the geographic codes, or the codes *and* the names associated with them (where applicable), or just the names.

| **Comma Separated Value File** | **Listing File** |
|---|---|
| ☑ Generate a CSV file | ☑ Generate a listing file |
| Just Codes (No Names)<br>Codes and Names<br>Just Names (No Codes) | Just Codes (No Names)<br>Codes and Names<br>Just Names (No Codes) |
| ☐ Use tabs (not commas) as delimiter | |

- Process time for large areas may be several minutes.

Reset Defaults | Run Request

*...following options further limit criteria set above*

## Point-and-Distance Options

**Specify a point (location) and distance to be used as filter:**

Value for radius of Circle **or** radius of largest Ring: 4 (In miles, unless you check ☐ here to specify kilometers.)

(See just below for links to help find coordinates.)

Coordinates of Point: 38.01143 degrees latitude, 92.75471 degrees longitude.

Label of Point: ________ (optional)

**Define Ring criteria specifying only one of the following two options:**

**Either:** ____ # of equi-distant rings (integer value between 1 and 10). Radius specified above will be divided by this to derive width of each Ring.

**Or:** Specify your own custom list of up to 10 ring radii values in ascending order (values must be greater than zero, may be fractional, and largest should equal the radius of the Circle specified above):

#1 0.25 #2 0.5 #3 1 #4 2 #5 3
#6 4 #7 ____ #8 ____ #9 ____ #10 ____

**Links** are provided here to facilitate obtaining coordinates for your location. See the HELP file

for more detailed information.

- The ETAK Eagle geocoder site lets you enter a street address or street intersection. It displays the coordinates as well as a long list of geographic codes (and will also draw you a map of the area about the point.)
- To get the coordinates of any ZIP code or city use Chris Stuber's Gazetteer
- To view the region of interest try his Tiger Map Server page.
- An alternate site for street addresses or street intersections is the Yahoo Map Server (but you'll need to see the help to find lat-long coordinates).
- View county names on state level maps, check the Census Bureau's Map Stats

**Note:** If you specify a lat-long location the variable "distance" will be added to your output. This requires that weighted centroids also be calculated (set automatically). The "distance" variable will be between the weighted centroid and the specified Point. If you specify Ring Pseudo-Geocodes then distance and weighted centroid values will *not* be calculated or stored (because weighted centroids of donuts are misleading).

## Bounding Box Filter Option

If you want to limit processing to blocks with center points that fall in a specified rectangular area you can enter the coordinates for such a "bounding box" next.

Define the "bounding box" coordinates in decimal degrees:

[ ] Northern-most Latitude [ ] Southern-most Latitude

[ ] Western-most Longitude [ ] Eastern-most Longitude

Process time for large areas may be several minutes.

[Reset Defaults] [Run Request]

***NOTE:** The rest of this form allows you to specify options that will limit the geographic universe to be processed. If you just want to process the entire state(s) that you have selected then you can ignore the rest of this form and submit your request now.*

## Geographic Filtering Options

You can specify any or all of 3 types of geography to limit the universe to be processed. You may, for example, only want to see a file with geography for a set of counties, or for a specific metro area (or areas), or possibly for a city (place). You can do so by entering the appropriate FIPS (Federal Information Processing Standard) codes in the text entry boxes that follow. If you need to "look up" the codes you can click on the links to the code-list files in each section.

By default, if you specify more than one kind of geography here then the application assumes that you want to "and" the selections, keeping only areas that satisfy all criteria. For example, if you specified three counties and a metro area, you would only get data based on blocks that were in **both** the counties and the metro area (i.e. the intersection of the selected areas.) To override this default and

choose geographies that satisfy *any* (rather than *all*) of your select criteria -- CLICK HERE: ☐

**All selections made below are in addition to the state-level or distance-based filtering which you specified above**

County codes . Enter 5-digit FIPS county codes with leading zeroes separated by blanks. You may enter 3-digit codes if you selected only one state. Your output will be limited to the counties specified.
Examples:

- 29189 29510 17163 17119 (selects 4 counties in 2 states)
- 005 017 049 (selects 3 counties from the single state selected)

Metro Area codes. Enter 4-digit FIPS metro area codes with leading zeroes separated by blanks. MSA, CMSA and PMSA codes may be used (4-digit only). The 1990 definitions will be used. Your output will be limited to the metro areas specified. New England NECMA codes can **not** be used.
Examples:

- 3760 1602 (Selects Kansas City MSA and Chicago CMSA)

Place codes. Enter 7-digit FIPS place codes with leading zeroes separated by blanks. You can enter 5-digit codes if only one state has been selected. Your output will be limited to the official city limits of these cities as of the 1990 census.
Examples:

- 70520 70545 70550 53780 06020
  (Saginaw City, Saginaw Township North and South, Midland, Bay City, MI)

● Process time for large areas may be several minutes.

Reset Defaults | Run Request

| Top | **SEDAC** | **UMSL UIC** | **FTP Archive** | **DDViewer** | **Credits** | **Comments and Suggestions** |

**Last Update: 09-22-98**

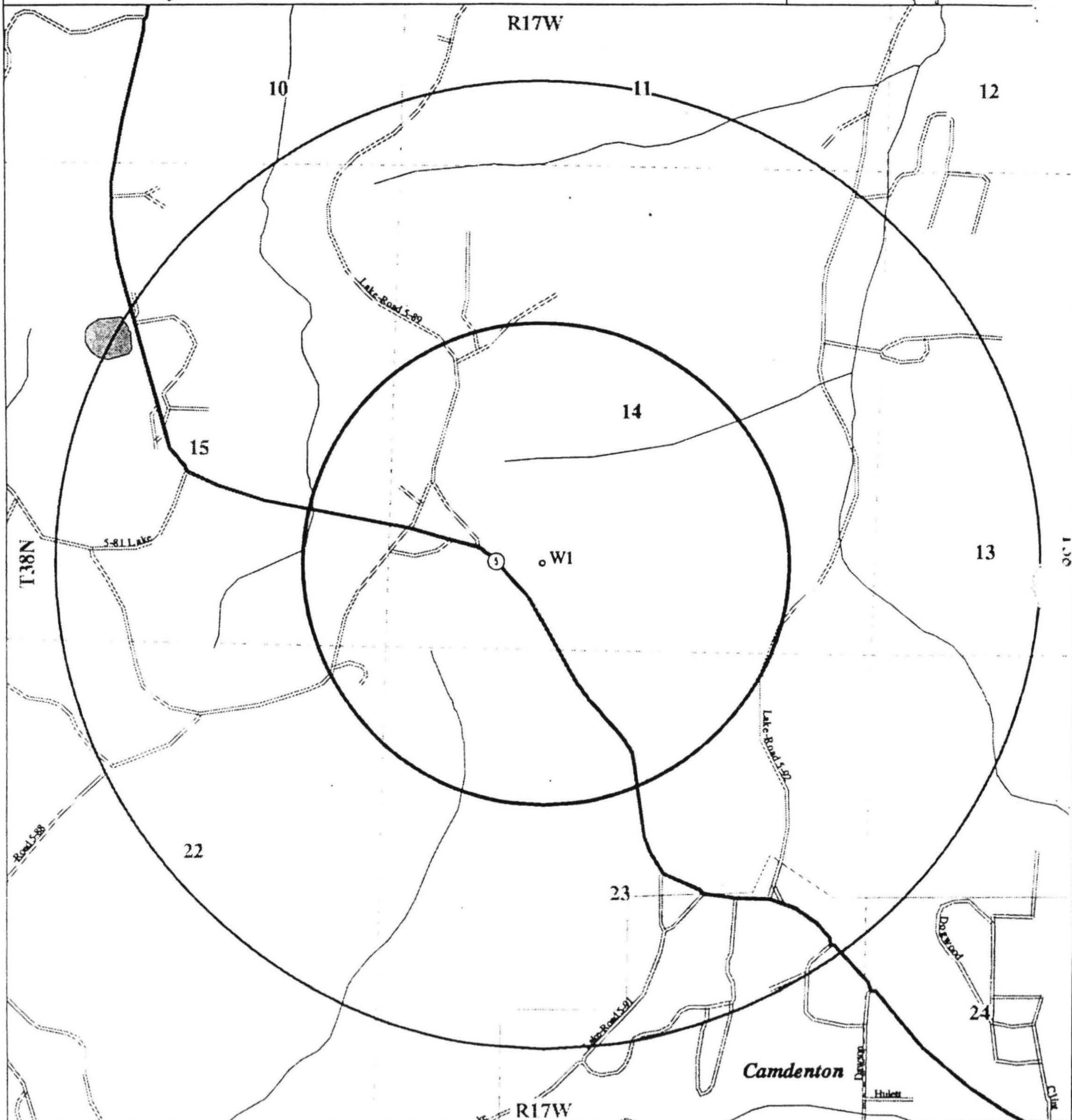
---

geocorr3 3.03 Rev. 99/01/15 / Process: 23822 (OSEDA/UIC, U. of Missouri) - Run 0
Listing of Geographic Correlations

| COUNTY | TRACT | RING | POP | AFACT |
|---|---|---|---|---|
| 29029 | 9505.00 | 0.25 | 180 | 0.053 |
| | | 0.50 | 696 | 0.204 |
| 29029 | 9504.00 | 1.00 | 0 | 0.000 |
| 29029 | 9505.00 | 1.00 | 1267 | 0.371 |
| 29029 | 9504.00 | 2.00 | 117 | 0.167 |
| 29029 | 9505.00 | 2.00 | 983 | 0.288 |
| 29029 | 9508.00 | 2.00 | 0 | 0.000 |
| 29029 | 9503.00 | 3.00 | 83 | 0.311 |
| 29029 | 9504.00 | 3.00 | 134 | 0.191 |
| 29029 | 9505.00 | 3.00 | 283 | 0.083 |
| 29029 | 9506.00 | 3.00 | 198 | 0.391 |
| 29029 | 9508.00 | 3.00 | 582 | 0.561 |
| 29029 | 9503.00 | 4.00 | 184 | 0.689 |
| 29029 | 9504.00 | 4.00 | 451 | 0.642 |
| 29029 | 9505.00 | 4.00 | 6 | 0.002 |
| 29029 | 9506.00 | 4.00 | 308 | 0.609 |
| 29029 | 9508.00 | 4.00 | 456 | 0.439 |

# Windsor Estates Nursing Home
# 3069006
# 1 well, 0 contaminant sites, 0 dealerships
Camden County

Former Hulett Lagoon Site
Combined PA/SI
Reference 61




Prepared by

CARES
University of Missouri – Columbia

| | | |
|---|---|---|
| Wellhead | Half Mile Buffer | U.S. Land Survey |
| Contaminant Site | Highway | County Boundary |
| Dealership | Street or Road | Incorporated Area |
| One Mile Buffer | Stream | Water Body |

This map is subject to change as additional information is acquired.
Production Date: October 02, 1996

0 3000
feet

Missouri Department of Natural Resou[rces]

Division of Environmental Quality
Public Drinking Water Program

# Windsor Estates Nursing Home
# 3069006
# 1 well

*Temporary DGLS well number. The correct well number is requested.

The information below represents the data currently associated with the water supply layers. The well/intake number corresponds to the well/intake numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired. Source: Missouri Department of Natural Resources, Public Drinking Water Program. Production Date: October 02, 1996

| | |
|---|---|
| Well Number | W1 |
| Extended PWS # | 3069006101 |
| Local Well Name | |
| DGLS Well # | 40392* |
| Latitude | 38 1 42.1 N |
| Longitude | 92 46 4.6 W |
| USGS 7.5 Quadrangle | Green Bay Terrace |
| County | Camden |
| DNR Region | Jefferson City |
| Date Drilled | 1969 |
| Material (C/U) | Consolidated |
| Total Depth (ft) | 600.000 |
| Casing Depth (ft) | 400.0 |
| Casing Size (in) | 6. |
| Casing Type | |
| Screen Length (ft) | |
| Screen Size (in) | |
| Static Water Level (ft) | 165.0 |
| Well Yield (gpm) | |
| Draw Down Level | |
| Determination Date | |
| Yielding Strata | |
| Pump Type | |
| Pump Level (ft) | |
| Capacity (gpm) | |
| Pump Meter (Y/N) | |
| Standby Power (Y/N) | |
| Date Abandoned | |
| Date Plugged | |
| VOC detections (Y/N) | N |
| Nitrate–N Level (mg/l) | N |
| Chlorination (Y/N) | N |
| Filtration (Y/N) | N |
| GWUDISW (Y/N) | |
| State Approved (Y/N) | |

Linn Creek
3010471
1 well, 0 contaminant sites, 0 dealerships
Camden County

Former Hulett Lagoon Site
Combined PA/SI
Reference 62


Prepared by

CARES
University of Missouri – Columbia

| | | |
|---|---|---|
| Wellhead | Half Mile Buffer | U.S. Land Survey |
| Contaminant Site | Highway | County Boundary |
| Dealership | Street or Road | Incorporated Area |
| One Mile Buffer | Stream | Water Body |

This map is subject to change as additional information is acquired.
Production Date: October 02, 1996

0 3000
feet

N

Missouri Department of Natural Resou

Division of Environmental Quality
Public Drinking Water Program

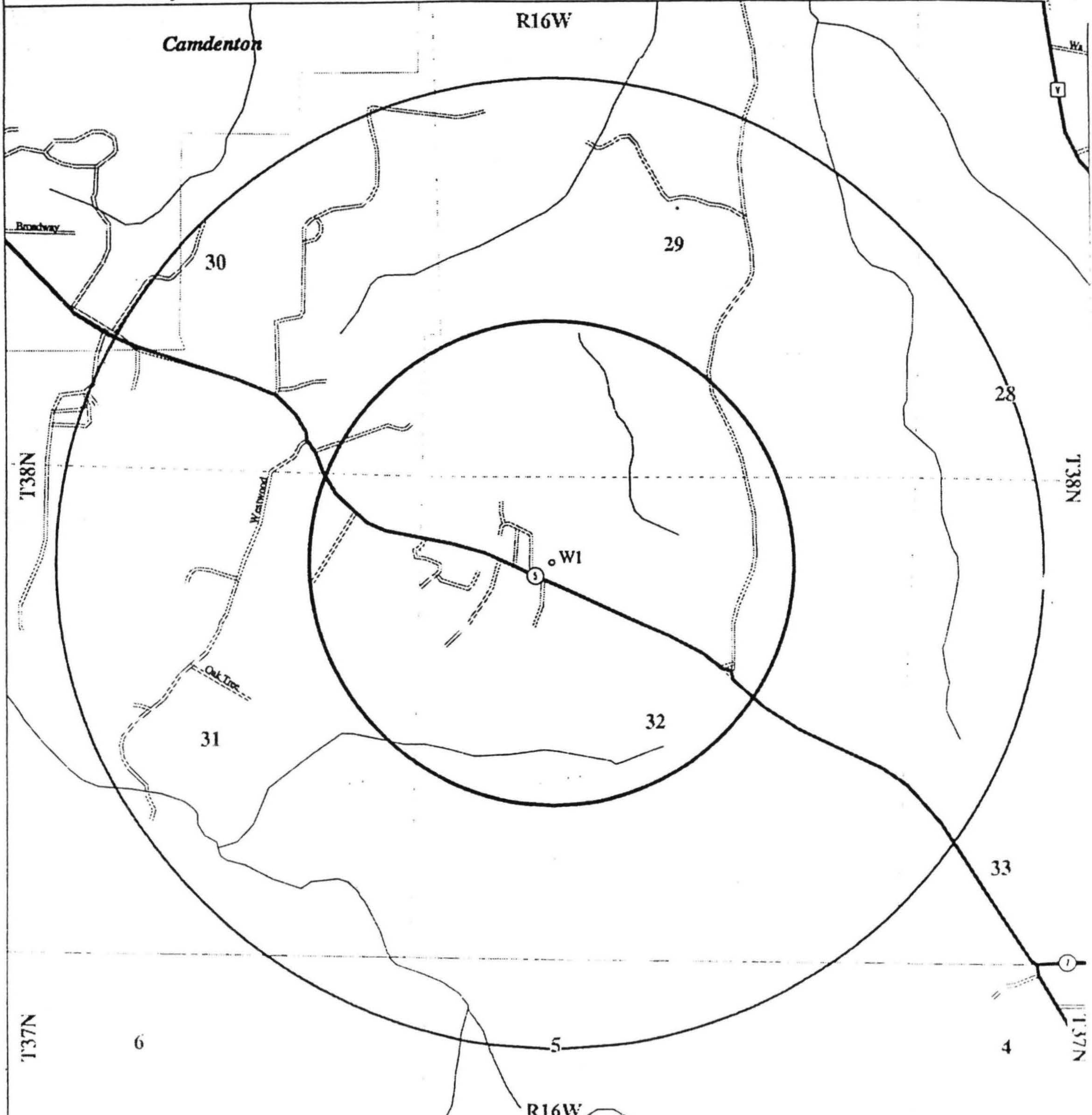
# Linn Creek
# 3010471
# 1 well

The information below represents the data currently associated with the water supply layers. The well/intake number corresponds to the well/intake numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired. Source: Missouri Department of Natural Resources, Public Drinking Water Program. Production Date: October 02, 1996

| | |
|---|---|
| Well Number | W2 |
| Extended PWS # | 3010471102. |
| Local Well Name | Well #2 |
| DGLS Well # | 28620 |
| Latitude | 38 2 3.7 N |
| Longitude | 92 42 36.2 W |
| USGS 7.5 Quadrangle | Camdenton |
| County | Camden |
| DNR Region | Jefferson City |
| Date Drilled | 1984 |
| Material (C/U) | Consolidated |
| Total Depth (ft) | 860.000 |
| Casing Depth (ft) | 528.0 |
| Casing Size (in) | 6. |
| Casing Type | Steel |
| Screen Length (ft) | |
| Screen Size (in) | |
| Static Water Level (ft) | 104.0 |
| Well Yield (gpm) | 70 |
| Draw Down Level | 125.0 |
| Determination Date | 1983 |
| Yielding Strata | |
| Pump Type | |
| Pump Level (ft) | 294 |
| Capacity (gpm) | 10 |
| Pump Meter (Y/N) | |
| Standby Power (Y/N) | N |
| Date Abandoned | |
| Date Plugged | |
| VOC detections (Y/N) | Y |
| Nitrate–N Level (mg/l) | N |
| Chlorination (Y/N) | N |
| Filtration (Y/N) | N |
| GWUDISW (Y/N) | |
| State Approved (Y/N) | |

Southway Terrace MHP
3048141
1 well, 0 contaminant sites, 0 dealerships
Camden County

Former Hulett Lagoon Site
Combined PA/SI
Reference 63




Prepared by

CARES
University of Missouri – Columbia

| | | | | | |
|---|---|---|---|---|---|
| ○ | Wellhead | | Half Mile Buffer | | U.S. Land Survey |
| ▲ | Contaminant Site | | Highway | | County Boundary |
| □ | Dealership | | Street or Road | | Incorporated Area |
| | One Mile Buffer | | Stream | | Water Body |

This map is subject to change as additional information is acquired.
Production Date: October 02, 1996

0 3000
feet

Missouri Department of Natural Resou

Division of Environmental Quality
Public Drinking Water Program

# Southway Terrace MHP
# 3048141
# I well

The information below represents the data currently associated with the water supply layers. The well/intake number corresponds to the well/intake numbers depicted on the accompanying map. Blanks indicate missing data. This table is subject to change as additional information is acquired.
Source: Missouri Department of Natural Resources, Public Drinking Water Program.
Production Date: October 02, 1996

| | |
|---|---|
| Well Number | W1 |
| Extended PWS # | 3048141101 |
| Local Well Name | |
| DGLS Well # | 26629 |
| Latitude | 37 59 35.2 N |
| Longitude | 92 42 56.5 W |
| USGS 7.5 Quadrangle | Decaturville |
| County | Camden |
| DNR Region | Jefferson City |
| Date Drilled | 1970 |
| Material (C/U) | Consolidated |
| Total Depth (ft) | 550.000 |
| Casing Depth (ft) | 350.0 |
| Casing Size (in) | 6. |
| Casing Type | Steel |
| Screen Length (ft) | |
| Screen Size (in) | |
| Static Water Level (ft) | 175.0 |
| Well Yield (gpm) | |
| Draw Down Level | |
| Determination Date | |
| Yielding Strata | |
| Pump Type | Submersible |
| Pump Level (ft) | |
| Capacity (gpm) | |
| Pump Meter (Y/N) | |
| Standby Power (Y/N) | |
| Date Abandoned | |
| Date Plugged | |
| VOC detections (Y/N) | N |
| Nitrate–N Level (mg/l) | N |
| Chlorination (Y/N) | N |
| Filtration (Y/N) | N |
| GWUDISW (Y/N) | N |
| State Approved (Y/N) | Y |